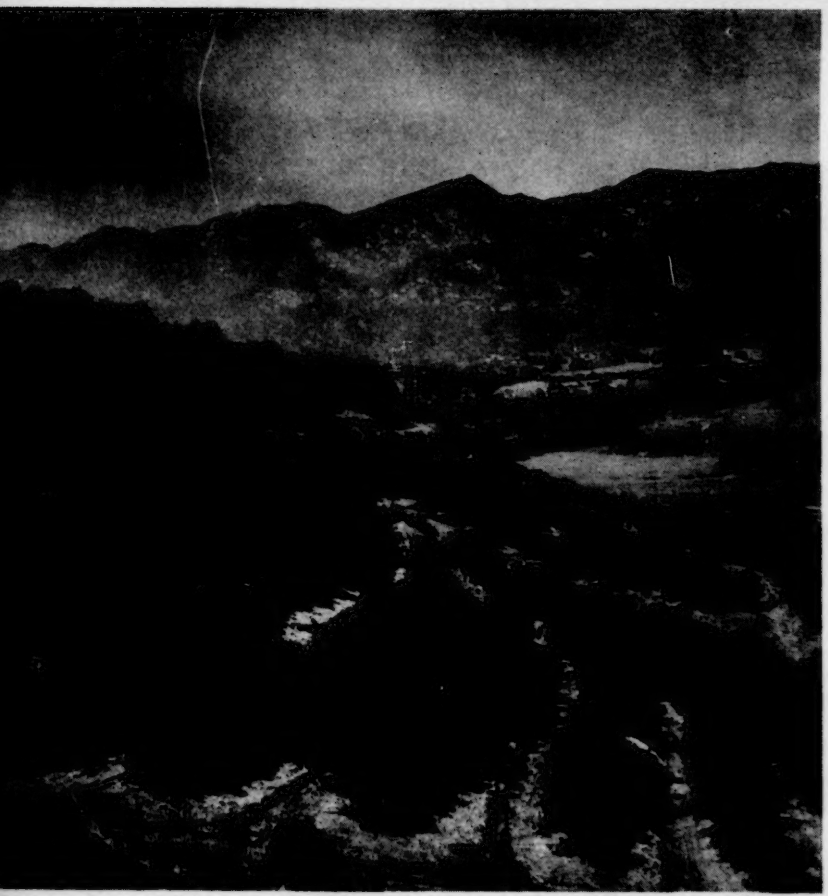

Volume 10, No. 1 January, 1955

History of Soil Conservation Districts in the United States
. . . LLOYD E. PARTAIN

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Research Program in Soil and Water Conservation
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San Fernando Valley SCD Active in Local Flood Control Program
. . . FRED A. HAUGHTON, JR., and CHARLES F. BOND

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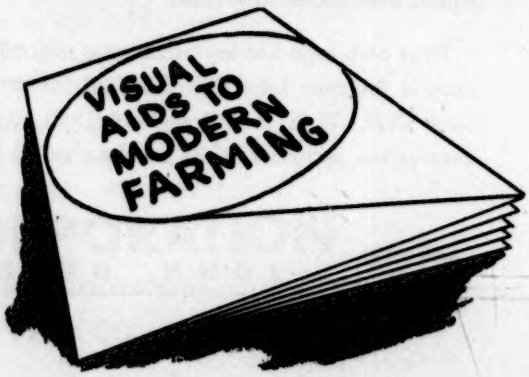

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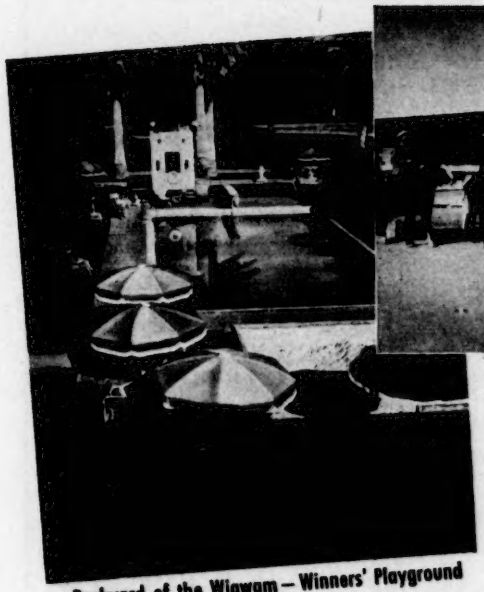

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VOLUME 10
NUMBER 1

Journal of SOIL AND WATER CONSERVATION

TO ADVANCE THE SCIENCE AND ART OF GOOD LAND USE

This JOURNAL is the official organ of the Soil Conservation Society of America. It is owned, edited, and published bimonthly by the Society.

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Cover: This eight year old lemon orchard is on the L. E. Kiler farm near Toro Canyon, California. The orchard is bench terraced and planted on the contour. Oil sprays are used to control weeds thereby eliminating cultivation.

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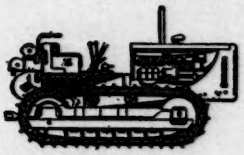

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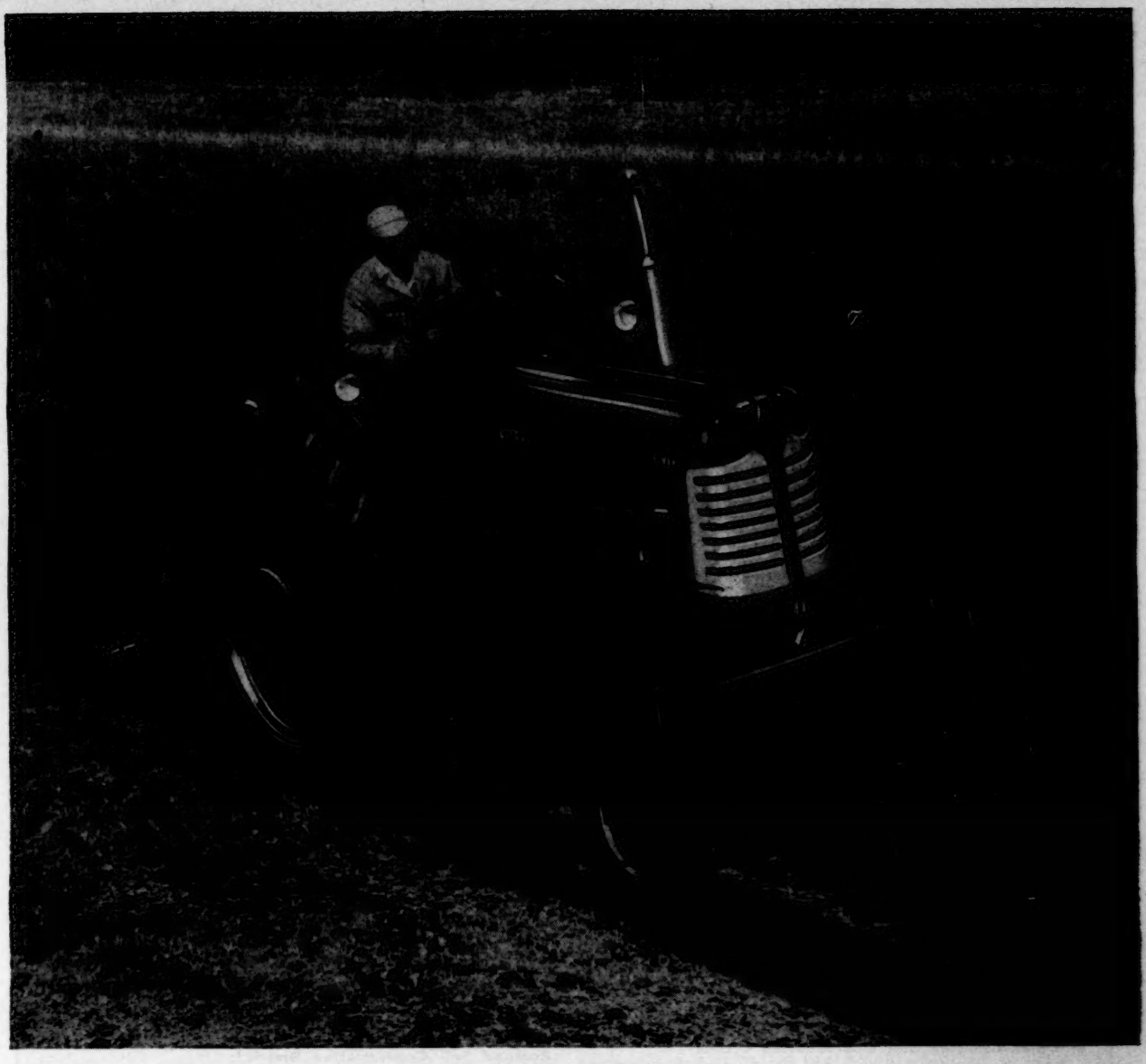

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A Brief History of Soil Conservation Districts in the United States

LLOYD E. PARTAIN

Today in the United States more than 13,000 farmers and farm land owners administer the affairs of 2,650 soil conservation districts—governmental units as subdivisions of states. Within the boundaries of these districts are about 1½ billion acres of farm and ranch land occupied by nearly five million farms and ranches. That's more than 90 per cent of all our farms and ranches and something like 85 per cent of the Nation's agricultural area. All this has taken place in less than two decades. Such a record challenges any known movement of local administration.

More important is the fact that good farmers are willing to administer their own programs locally. How well they have done their job can be measured only by the results on the land.

ORIGIN OF THE CONCEPTION of Soil Conservation Districts is somewhat obscure. A specific suggestion, however, was made before the Subcommittee on Public Lands of the House of Representatives in March of 1935. Before that group Hugh Hammond Bennett, chief of the Soil Erosion Service of the U. S. Department of Interior, suggested, among other recommendations, that provisions should be made for *"the carrying out of practical erosion control measures . . . in cooperation with conservancy districts or other subdivisions of states and other erosion control associations or similar organizations."*

Dr. Bennett had spent most of his life in soil survey work in which he observed, studied, and recorded the causes and effects of man-made soil erosion. He had directed the establishment of soil erosion experiment stations in cooperation with certain Land-Grant Colleges as a result of congressional action and appropriations in 1928. It was in his new position as chief of the Soil Erosion Service, established by Congress in the early Franklin D. Roosevelt Administration, that the House Committee had asked for (1) *a report on soil erosion damage throughout the country,* (2) *a detailed account of the watershed soil conservation demonstrations underway,* and (3) *a proposal outlining the needs of a national soil and water conservation program looking far into the future.*

By his very nature, Dr. Bennett related everything he thought and did to the man on the land—the individual farmer and all his mistakes and accomplishments. He was sure that farmers themselves should determine the extent to which they wanted soil and water conservation practices on their land. He was convinced of other principles, too: that farmers, by custom and action, would protect their individualism and resent any semblance of bossism from above; that farmers and landowners across the country were becoming eager to participate in land face-lifting work as a result of what they had seen in the watershed demonstration projects; and that local, State and Federal partnership would be required to get the job done in a manner most satisfactory to all concerned.

Dr. Bennett was very sure of other things, too: that since the forces of nature causing erosion damage were no respecter of property lines or political boundaries, the land planning and treatment for best results should be done by problem areas with the fullest cooperation and participation of all the people concerned; that complete conservation treatment required, even on most individual farms, several different measures and practices in accordance with the needs and capabilities of every acre; that scientific research and land surveys, technical assistance, and leadership were required to get the job done properly and that these for the most part should be the responsibility of government.

In April of 1935, Congress passed the National Soil and Water Conservation Act (Public Law No. 46) creating the Soil Conservation Service as a permanent agency within the Department of Agriculture and transferred to it the personnel and functions of the Soil Erosion Service.

Others had shared Dr. Bennett's feelings that any farm program should be run by farmers in a way that the individuals participating in it would naturally develop more satisfaction in getting the job done from the ground up. This was highly important since most of the actual soil and water conservation work would actually have to be done by the farmer's own labor and facilities.

White House Conservation Conferences

The late J. Phil Campbell, first and long time director of the Georgia Agricultural Extension Service, had attended two historic White House-called conservation conferences. The first was led by President Theodore Roosevelt in 1908—the other by President Franklin D. Roosevelt in 1933. Both conferences had stressed the nation's natural resources as basic wealth and their conservation, protection, and wise use as a national problem. Both had called on Governors of States and their specialists for their suggestions and participation. Mr. Campbell felt that the problem, if ever solved, would have to be tackled at the "grass roots." Tried and proven methods of educa-

Lloyd E. Partain, a Charter member of the SCSA, is director of agricultural relations and marketing for BETTER FARMING *magazine, formerly the* COUNTRY GENTLEMAN. *Mr. Partain's headquarters are in Philadelphia, Pennsylvania.*

tion-by-demonstration on farms in local communities everywhere possible was a suggestion offered by Mr. Campbell. With these, he believed farmers would help educate their neighbors and that such functions should be encouraged locally by county agents and vocational agriculture instructors. He advocated the community or group approach with adequate technical guidance.

M. L. Wilson, Iowa-educated agronomist and Montana-experienced Extension Service county agent and specialist, was on the national scene too to become Assistant Secretary of Agriculture. The thought of a local soil conservation district mechanism spurred him to thinking of a practical way for districts to be set up and operated. He probably more than any other person thought out the procedure that was finally adopted.

A task force was set in motion to work out a suggested proposal. Rural democracy always prevailed in the thinking of that group which was composed of, among others, such well-known men as Milton S. Eisenhower, who was a vital coordinating influence, Dillon S. Myer, Ohio and Kentucky-experienced Extension Farm Management Specialist, Charles Collier, a student of public and Indian land problems, and Ward Shepard, excellent counselor on practical matters pertaining to agriculture. After the principles were pretty well thought through and agreed upon, legal specialists, Nathan R. Margold, then Solicitor of the Department of Interior, and Philip M. Glick, Chief of the Land Policy Division of the Solicitor's Office of the Department of Agriculture, were called upon. The result of all this was the preparation of the Standard State Soil Conservation Districts Law. This was suggested as a guide to governors and state legislators for use in creating state enabling legislation permitting the creation and operation of legally constituted Soil Conservation Districts as sub-divisions of State Government. Under such enabling laws, these districts would be created and operated by landowners themselves.

By the time this recommended Standard State Soil Conservation Districts Law was finally drafted, about two years had passed since the 1935 sub-committee hearings.

The National Soil and Water Conservation Act had passed without a dissenting vote. It established the Soil Conservation Service as a permanent technical agency of the U. S. Department of Agriculture, with authority to work directly with farmers and ranchers, on their farms and ranches, to apply conservation to the land.

An interbureau committee of the Department of Agriculture, designated to study the functions and relationships of the new program in all its ramifications, sat for six weeks and produced a report and recommendations charter-like in breadth and foresight.

Its report called for the formation of legally constituted soil conservation "associations" through which the Soil Conservation Service might aid farmers in carrying its program into direct application on the land. Moreover, the "charter" set a date—July 1, 1937—for the beginning of such a local participation program.

Out of those years came one of the most purposeful and urgent program-building endeavors ever carried out through our democratic channels and methods. Many people helped, from many parts of the country and of varied interests, but all recognizing the need and the importance for this type of work on the land. Two immediate goals constantly confronted them as they attacked the job of patterning a long-range program to conserve the Nation's land resources. The proved soil and water conservation practices and combinations of practices must be spread out on the land in demonstration areas; and the soil conservation district idea must be transferred from dream to reality and offered to the American people.

The demonstration program carried out under the leadership of the Soil Conservation Service furnished an opportunity for farmers to see how various practices functioned and appraise the advantages of conservation use of land and water resources. They were valuable proving grounds, because in many areas the work in the demonstrations had to proceed simultaneously with research developments at experiment stations.

Some 185 demonstration areas were established. In addition, the work carried on at some 400 C.C.C. camps were designated as erosion control operations. Technicians of the Soil Conservation Service supervised the erosion control work of these camps.

By 1937, about 50,500 farmers in the demonstration areas had signed cooperative agreements while literally hundreds of thousands of farmers far removed from the areas had signed cooperative agreements while literally facilities for broader participation in the great soil-saving movement.

It was during this formative and demonstrational period that many people began to feel that soil conservation could be speeded up only by giving greater responsibility to farmers and ranchers themselves. It was argued that, inasmuch as farmers own and control the land, and must therefore have the final decision as to any work carried out on their lands, they should direct the program.

This type of thinking tied in splendidly with the proposal of a Standard State Soil Conservation Districts Law which was being developed and presented to the states and farm communities for consideration. It was late in February 1937 that the governor of each state received several copies of the suggested legislation with a letter signed "Franklin D. Roosevelt."

In the letter the President mentioned "the dust storms and floods of the last few years" and used the oft-quoted sentence "The Nation that destroys its soil destroys itself." And, finally, "To supplement the Federal pro-

grams, and safeguard their results, state legislation is needed. At the request of a number of states, and in cooperation with them, the Department of Agriculture has prepared a standard form of suitable state legislation for this purpose. . . . The Act provides for the organization of 'soil conservation districts' as governmental sub-divisions of the state. . . . I hope you will see fit to make the adoption of legislation along the lines of the Standard Act part of the agricultural program for your state."

States Enact Soil Conservation District Laws

Results were, to say the least, gratifying. Some people have used the word astounding. Arkansas passed the State Soil Conservation Districts Law in less than a week, on March 3, 1937. Others followed in such rapid succession that it was impossible to keep up with them. By the end of that year, 22 states had enacted such laws. All authorized creation of districts by action of farmers and ranchers, with legal status, to ensure continuance and progress of soil and water conservation.

By July 1, 1945, all 48 states had passed such laws, with Puerto Rico and the Virgin Islands in 1946, and Hawaii and Alaska in 1947.

The first soil conservation district was chartered August 4, 1937. It was the Brown Creek District in North Carolina—the first of its kind in history. June 9, 1947, was "Billion Acre Day." On that day the San Juan Soil Conservation District in Colorado was chartered, bringing the total land in soil conservation districts to a billion acres.

In the business of organization alone, certainly the district movement has been highly successful. It has given farmers and ranchers what they felt they needed to get the conservation job done—a practical device for dealing first-hand, effectively, democratically, and at the grass roots, with the matter of taking care of their own land, improving it as they use it, for their own benefit and the good of their communities and the whole country.

Another thing about the districts that cannot but impress us, even amaze us when we know how much planning and hard work is involved, is that they have shown no inclination to deviate. They organized to get soil and water conservation on their land and that is what they have done, are doing, and intend to continue to do.

Some comparison, involving statistics from official records, are helpful in showing how districts have moved forward in accomplishments as more and more were organized yearly, bringing more and more farmers and ranchers into participation.

In 1935, when the program had been in operation under the demonstration plan for about a year and a half, the Soil Conservation Service could report the farm conservation job completed on less than a million acres.

By 1937, when the first district was organized, most of the treatment required on 4,200,000 acres had been done —this, still through the demonstration plan.

In 1942, five years after the district movement started, basic conservation measures were applied in the districts, in that one year, to 5,388,000 acres.

Then, during the fiscal year 1950, needed conservation treatment was applied in the districts to more than 26,000,000 acres—an increase of 338 per cent in the rate of applying conservation to agricultural land.

In 1953 application of practices increased 6.6 per cent, and in 1954 an additional four per cent.

The sum and substance is that through their soil conservation districts farmers and ranchers, with technical assistance still inadequate to meet demands, have been able to increase the rate of applying conservation measures about 400 per cent.

Districts measure their achievements by actual accomplishments on the land. How successful they have been to date is reflected in such facts as these: about 1,500,000 farmers and ranchers, whose farms and ranches total 450,000,000 acres, are now using scientific soil and water conservation measures in their season to season operations. About a million of them have their basic conservation plans, while the remainder are in the initial or middle stages working toward basic plans. Upwards of 200,000 have completed the work of applying all needed conservation practices. There is still a big job ahead for districts.

A tremendously important feature of the districts' programs and work has been greater per acre yields that farmers and ranchers have realized from their conservation work on their land. Thousands of reports from every part of the country leave no question as to the economic benefits of soil and water conservation. It pays its own way and more. It pays in higher per-acre yield and consequently higher incomes; greater efficiency of labor, machinery, seed and fertilizers; better farming and better living for the farm family; better business for the banker, merchant and professional man in town; and increased revenues to local, state, and federal government.

Crop, grazing, and farm woodland yields of Soil Conservation District cooperators have increased about 36 per cent, on the average, as a result of their conservation farming and ranching. Double and sometimes tripled per-acre yields of individual crops such as corn, cotton, hay and others, are not uncommon. And recently reported from the cattle producing country are 40 per cent increase in calf crop and 200 pounds in weight as the result of a soil conservation district program introducing new grasses and clovers and other rangeland improvement practices.

Aside from physical land treatment and gains in yields through district programs, there are other benefits from the movement which have become more and more apparent year by year. The 13,000 or so soil conservation dis-

trict supervisors now occupy a key position in the Nation's expanding resource conservation movement. They have demonstrated their willingness and ability to shoulder the many responsibilities that go with their jobs.

The supervisors through experience, hard work and devotion to the conservation movement, have attained a high degree of leadership in the field of agriculture. They have become a mainstay in attaining the conservation objective—pulling together in a true national program of service. They have many duties. They *give* their time and efforts to their communities. They must constantly review their district programs and work plans. This means working personally with their district "cooperators" (individual farmers) on their needs and problems. It means pulling together and putting to effective use all the public and private facilities which will speed up their programs.

Many Agencies Cooperate With Districts

County commissioners, State Departments of Conservation, Forestry, Highways, and Fish and Game, in many areas provide services and materials to soil conservation for use in carrying out plans on the land. The United States Forest Service, the Fish and Wildlife Service of the Department of the Interior and other Federal agencies have entered into cooperative arrangements in many districts to aid local programs. More such cooperation is highly desirable and perhaps can be anticipated.

State Agricultural Extension Services and their county agents have had a responsibility to soil conservation districts from the start—a responsibility to the farmer and farm youth in conservation education and leadership. This was recognized early by extension people at the national, state and local levels. The February 1939 issue of the EXTENSION SERVICE REVIEW carried an article by Ed Roberts, extension soil conservationist of Oklahoma, in which he said:

> *"Individual farmers have been practicing measures of erosion control for years, but they have learned that it is a difficult if not a losing single-handed fight. They recognize that erosion control is not a one-man job and that no single remedy solves the problem. They reason that partial treatment of the problem cannot equal a community-wide cooperative program backed by enthusiastic local leadership. As the forces of wind and water are not halted by the section line or fence row, erosion becomes a community problem, and community problems require community action."*

As this article indicates, the soil conservation district provides an excellent ready-made medium for extension activity in the interest of conservation education work.

State Agricultural Experiment Stations supply research service in the solution of soil conservation district problems. Many have set up field experiments in cooperation with district supervisors and cooperating farmers. Land Grant Colleges have in many cases developed curricula for better training students to become soil conservation technicians.

Districts have been a powerful influence in establishing a sounder base for financial aid to conservation and other agricultural programs. And, by their very existence as a field and force for conservation, the districts have been helpful in coordinating and unifying other conservation groups, such as wildlife, water and forest conservation groups, in all states. Undoubtedly, the districts have paved the way for watershed protection projects as authorized by the 83rd Congress last summer. Districts are now sponsoring and assisting the watershed projects already started.

Not only do soil conservation districts have the administrative machinery for taking the leadership in these watershed projects, they are in a position to form a federation of several districts to carry out at the grass roots level the objectives and needs on small tributary watersheds of a large drainage area as has been the outstanding example in the Muskingum Conservancy District in Ohio. Watershed associations have sponsored soil conservation district organization and operations as in the case of the Brandywine Valley Association in Eastern Pennsylvania.

Watershed programs will generally find soil conservation districts ready to move ahead quite rapidly toward establishing upstream conservation work on the land that will aid in flood control and other functions of an authorized watershed program. Many districts own and operate earth moving equipment, specialized cultivation, planting and harvesting equipment—seeders, sprayers, tree planters, seed cleaners and re-cleaners, combines, heavy deep tillage machines, power saws, etc., the use and maintenance of which is paid for by farmers on whose land these items are used. Many also provide warehouses and storage facilities for seeds, fertilizers, limestone, planting stock and other district needs. Some own transportation equipment, engineering instruments, soil sampling and soil testing facilities. All these as well as district personnel can be harnessed into a unified watershed and water development program. Water conservation, water management and irrigation development have been important phases of many soil conservation districts for several years. Only limitations as to a sufficient number of trained personnel have kept the program from moving even faster.

The history of soil conservation districts in the United States is just short of being phenomenal, but this is no time to be complacent—the job actually has merely been started. The major work on the rural landscape remains to be done. In the true American tradition, the more satisfactory way will be the democratic way.

Developments in the Small Watershed Approach To Flood Prevention and Conservation

CARL B. BROWN

The last session of the 83rd Congress enacted three highly significant pieces of national legislation—the Watershed Protection and Flood Prevention Act, revision of the Water Facilities Act, and Section 175 of the new Internal Revenue Code which allows deduction as operating expenses of costs for installing certain soil and water conservation measures. This legislation will give impetus to the small watershed approach to flood prevention and conservation.

This article reviews the accomplishments in 11 watersheds under the Flood Control Act of 1936, and the pilot watershed program on 60 small watersheds started more than a year ago. It also describes the principal provisions of the new legislation and gives a brief forecast of what may be expected as a result of the large current interest in carrying out watershed projects.

Carl B. Brown

THE FIRST of the three new pieces of conservation legislation passed by the 83rd Congress was the Watershed Protection and Flood Prevention Act, Public Law 566. The second was Public Law 597, which amended the provisions of the Water Facilities Act of 1937 and extended its applicability to the entire United States and included within its scope all soil- and water-conserving measures. The third was Section 175 of Public Law 591, which is the new Internal Revenue Code of 1954. This Section permits the deduction as operating expenditures, up to 25 per cent of gross income derived from farming, of those costs incurred for the application of soil- and water-conservation measures. These Acts will not only promote conservation in general, but will give large impetus to better development, protection and management of land and water resources in the Nation's small watersheds.

Recognition of the watershed as an essential entity for soil and water conservation is not new. Watershed protection was the basic concept involved in setting aside national forest reserves beginning in 1891. It is embodied firmly in subsequent national forest legislation.

The demonstration areas established by the old Soil Erosion Service in 1933-35 were mainly creek-size watersheds. Provisions were made in many of these demonstration areas to measure the effects of erosion control or runoff and sediment loads of watershed streams.

Accomplishments in Eleven Watersheds

Watershed treatment was first given definite recognition in substantive legislation by the Flood Control Act of 1936. As a result of surveys made under authority of this Act, programs of watershed improvement were authorized in 1944 in eleven watersheds comprising about 30,000,000 acres. Operations were started in these areas in 1947 by the Soil Conservation Service and Forest Service. Substantial accomplishments have resulted from the expenditure to June 30, 1954, of $41,600,000 of federal funds appropriated for works of improvement in these watersheds and of non-Federal costs about two-thirds as much, representing the value of labor and materials as well as cash.

For example, this local-state-Federal effort has made possible soil surveys of 2,800,000 acres. It has resulted in the preparation of basic conservation farm plans on 32,500 farms containing over 6,800,000 acres. Assistance given in the application of conservation farm practices has resulted, in round figures, in 673,000 acres of contour farming, 424,000 acres of pasture and range seeding, and 30,700 miles of terracing—to mention but a few practices applied by landowners and operators.

Additional works of improvement installed by contract and force account, with costs being shared by the Federal government, local organizations and landowners and operators, include 205 floodwater-retarding structures, 457 major gully-stabilizing and sediment-control structures, 2,521 silt and debris basins, 471 miles of stream-channel stabilization, and improvement and permanent revegetation by grasses, legumes, and trees of more than 125,000 acres of critical runoff and silt-source areas.

I would like to add a word about the 205 floodwater-retarding structures constructed up to last June 30 and the additional 55 structures placed under contract since that date. These 260 structures will have a total capacity

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of 167,500 acre-feet, or an average capacity of 644 acre-feet per structure. No structure exceeds 5,000 acre-feet in total capacity. These structures will cost approximately $6,480,000. This includes engineering costs but not the value of land, easements, and rights-of-way which were donated or purchased in all cases by landowners or local organizations. The average cost of these structures has therefore been approximately $39 per acre-foot—a cost per acre-foot considerably less than that of most larger dams. Moreover, the fact that costs of these structures represent less than 15 per cent of total expenditures out of appropriations made under the Flood Control Acts effectively answers the charge sometimes heard that this program is just one of building small dams.

I think it would be fair to say that the demonstration provided by the work accomplished in the eleven authorized watersheds has been a major factor in increasing public interest in watershed protection and upstream flood prevention. Of course, increasing flood damages, opposition in some areas to big dams, drought and the resulting need for water conservation have all contributed to the rising tempo of public demand for finding a way to move ahead more rapidly in the field of watershed protection and flood prevention.

Figure 1. This streambank construction job is on Buffalo Creek in Erie County, New York. Similar jobs are in operation on other watershed areas throughout the country.

Pilot Watershed Program

In response to forceful public appeals, the first session of the 83d Congress made an appropriation of 5 million dollars to enable the Department of Agriculture, operating through the Soil Conservation Service and Forest Service, to start a new program of small pilot watershed projects as a means (1) for finding out the best ways of developing a local-state-Federal partnership in planning and carrying out a watershed-protection and flood-prevention program, and (2) to serve throughout the nation as demonstrations of the benefits to be derived from such work. This pilot program is now in its second year of operations. It includes 60 small watersheds located in 34 states, and is expected to cost about 29 million dollars in Federal funds, measured against a non-Federal contribution of a like amount in labor, services, materials, and cash. This program is indeed proving to be just what Congress expected of it—an exceedingly valuable testing ground. It is showing with increasing clarity how successful watershed projects can be developed by local people with the help of agencies of government; and also what obstacles to this type of approach exist in some areas. While everyone welcomes a successful demonstration, most people concede that a pilot program is one in which the lessons of failure or near failure may be just as valuable as the successes in pointing out the right paths for the future.

More than two-thirds of the pilot watersheds will be highly successful demonstrations. The reasons why some will fail to show substantial accomplishments are, on the other hand, equally significant to the successful development of new watershed projects under Public Law 566 passed by the last session of Congress.

Accomplishments in the first year of the pilot watershed program make a creditable record even though operations covered only about nine months of the year. Work plans were practically completed for all 60 watersheds, which contain altogether about 3,000,000 acres, but range in size individually from a little over 2,500 acres to more than 200,000 acres. With watershed protection funds the Soil Conservation Service completed soil surveys on 160,000 acres and helped 269 farmers and ranchers complete basic conservation plans on 40,673 acres. Assistance was given in the application of contour farming on nearly 7,000 acres, 346 miles of terracing, 2,500 acres of range improvements and nearly 500 acres of tree planting. Forty-eight contracts were let for 191 structural works of improvement. Two of the projects were essentially completed during the first year. The Forest Service installed nearly 500 stabilizing and sediment-control structures and planted over 200 acres within national forests included in the pilot watersheds. It gave assistance in tree planting on nearly 800 acres of private lands and developed fire protection for nearly 50,000 acres of woodland.

To October 15, contracts had been let for 66 flood-water-retarding structures having an aggregate capacity

of 26,000 acre-feet at a cost of $1,888,000. This represents an average capacity of about 400 acre-feet per structure and an average cost, including engineering but not the value of land, easements, and rights-of-way, of about $72 per acre-foot. As a number of these structures afford protection to urban areas as well as agricultural land, design requirements and, hence, average per acre-foot costs have been higher than in the eleven authorized watersheds. The floodwater-retarding structures to be built during the first two years of operations of the pilot watershed program will cost only about 25 per cent of total Federal costs during this period. While planning has not been completed in all watersheds, it appears that about 750 floodwater-retarding structures and 1,900 stabilizing and sediment-control structures will be required. This is an average of one retarding structure per 4,000 acres and one stabilizing structure per 160 acres. It should not be inferred, however, that this distribution would apply in any single watershed or regional area.

About 50 per cent of the total cost of the pilot watershed program will be borne by the Federal government, the remainder of the cost representing the appraised value of conservation and flood-prevention measures installed by local interests, the value of land, easements, and rights-of-way, and cash provided for sharing in the costs of construction of structural measures.

In carrying out this program, the Department has obtained the assistance of the U. S. Geological Survey and the Weather Bureau in installing and maintaining precipitation, streamflow and sediment-sampling stations to measure the hydrologic effectiveness of the works of improvement. It has obtained the assistance of the Land and Water Section in the Production Economics Research Branch of the Agricultural Research Service to assist in evaluating the economic effectiveness of the conservation measures installed in the watershed.

The Watershed Protection and Flood Control Act

The Watershed Protection and Flood Prevention Act, Public Law 566 passed by the last session of Congress, provides a new Federal authority replacing that contained in the Flood Control Acts, except for continuation of work in the eleven authorized watersheds. This act establishes the permanent legislative machinery under which the Federal government, through the Secretary of Agriculture, can cooperate with local organizations, including the states, in planning and carrying out works of improvement for flood prevention and the agricultural phases of the conservation, development, utilization, and disposal of water.

Works of improvement for which assistance may be provided under this Act include structural and land-treatment measures for (1) flood prevention (measures that produce significant and measurable reduction in flood and sediment damages) and for (2) agricultural water management, including irrigation, drainage, agricultural water supply and water conservation for agricultural use.

The initiative for all projects under this legislation must come from the people of the locality where the pro-

Figure 2. This small watershed in Pennsylvania is almost completely treated with needed conservation practices. Proper land treatment is the first step in watershed protection and flood prevention.

posed program is to be carried out. Application for assistance by the Secretary of Agriculture must come from a local organization "having authority under state law to carry out, maintain, and operate the works of improvement." A "local organization" may be "any state, political subdivision thereof, soil or water conservation district, flood prevention or control district, or combinations thereof, or any other agency" that has this requisite authority.

Assistance by the Secretary of Agriculture can be provided only after a qualified local organization has prepared an application, submitted it to "the state agency having supervisory responsibility over programs provided for in this Act," or to the governor if there is no such agency, and the application has either been approved or has not been disapproved within 45 days from the date of its submission.

In order to assist local organizations, the Secretary is authorized under this Act to conduct necessary surveys and investigations, prepare plans for works of improvement and determine their physical and economic soundness, to enter into agreements with "local organizations" to provide financial and other assistance, and to secure the cooperation and assistance of other Federal agencies in any program developed under the Act.

This legislation imposes several requirements on local organizations in addition to making the initial application. They must acquire without cost to the Federal government all necessary land, easements, and rights-of-way; they must be willing and able, in addition, to assume such proportional share of the cost of installing any works of improvement as may be determined by the Secretary to be equitable in consideration of the anticipated benefits from such improvements; they must be willing and able to operate and maintain all improvements; they must provide assurances that landowners have acquired all necessary water rights in accordance with applicable state laws; they must obtain agreements from owners of not less than 50 per cent of the land above any retention reservoir to carry out recommended soil conservation measures and proper farm plans. After July 1, 1956, they must be prepared to let all contracts for works of improvement, and, if capable of doing so, are expected to let contracts for all such improvements prior to that date.

The Act contains certain other limitations. The size of the watershed on which assistance can be provided is limited to 250,000 acres. However, where the local sponsoring organization(s) so desire, several watersheds, when they are parts of a larger watershed, may be planned together.

No structure having a total capacity of more than 5,000 acre-feet may be planned. The Secretary may not provide financial assistance for any part of the capacity of such structures for purposes other than flood prevention and features related thereto, nor may he provide assistance for land-treatment measures at a rate exceeding that for similar practices under existing national programs. The Secretary may not provide assistance unless the benefits of the project exceed the costs.

By law or under the President's rules and regulations, the Secretary may not submit the work plan for a watershed to the Congress through the Office of the President until it has been reviewed by the Governor or designated state agency and by the Secretaries of the Army and Interior and by other directly concerned Federal agencies (60 days being allowed therefor) nor may he begin to provide assistance until the plan has been before the Congress for 45 days while Congress is in session.

Public understanding of certain differences between the pilot watersheds and the permanent program authorized under Public Law 566 is important. The pilot projects were selected within a matter of days in response to a request from the Congress. They were all areas in which data then in existence indicated the need for remedial measures for flood-prevention purposes. Many of them were sample watersheds, surveyed under authority of the Flood Control Acts to develop data on much larger watersheds of which they were a part. From the standpoint of developing a physical plan, most of them met the then existing criteria for economically justified watershed improvements. Only one factor was missing. No time was available for thorough consultation with local organizations and the states in the selection of the pilot watersheds. The ability and willingness of local interests and the states to carry their share of the burden of planning and installing works of improvement could be ascertained only after the projects had been selected. As has been pointed out, this situation cannot exist in the new watershed program because it provides for project development only as a result of local initiative and for carrying out works of improvement only after local understanding and local agreement on cost sharing, operation and maintenance, and other factors. On the other hand, the new legislation authorizes assistance in agricultural phases of water, such as irrigation and drainage, for which assistance cannot be given in the pilot watersheds.

Public response to the new Watershed Protection and Flood Prevention Act has already been overwhelming. Up to November 1, the governors of 37 states had provided administrative machinery for carrying out the states' responsibility in reviewing and approving applications from local organizations for Federal assistance. The types of state agencies designated have varied widely. State soil conservation committees, commissions, or boards have been designated more often than any other state agency. Other types of state agencies designated include departments of agriculture, departments of con-

Figure 3.—Floodwater-detention dam in Sandstone Creek Subwatershed, Cheyenne County, Oklahoma, immediately after storm of April 29, 1954. Water is being discharged within channel capacity from a twelve-inch pipe through the dam.

servation, flood control or water resources boards or agencies, and state engineers. In several states the governor has appointed advisory committees including various state officials but has reserved to himself the approval function.

Up to November 1, 155 applications for assistance on specific watersheds, bearing approval of designated state agencies or governors, had been transmitted to Washington. Advice from the states indicates that more than 500 applications for assistance may be submitted to the designated state agencies or governors for consideration during the first year following the passage of the Act. No information is available as to the average size of these watersheds, but if they are comparable in general with the pilot watersheds, which average about 50,000 acres, this would represent local interest this year in developing watershed projects on some 25 million acres, more than eight times the aggregate area of the 60 pilot watersheds.

Amended Water Facilities Act

The amendment of the Water Facilities Act, Public Law 597 of the last Congress, is an important milestone in the history of agricultural finance. Provision for insured loans under this Act fills what heretofore has been a significant gap in meeting the credit needs of farmers and ranchers and of local organizations and agencies for carrying out works of improvement for soil and water conservation, irrigation, and drainage.

Under the revised Act, which is applicable in the entire United States and Territories, the Secretary of Agriculture is authorized to make or insure loans, where credit is not available from other sources, to individual farmers and ranchers in amounts not exceeding $25,000 at any one time and to local agencies in amounts not exceeding $250,000 at any one time for carrying out any needed improvements for the specified purposes. This new source of insured credit or direct Federal loans will be valuable in carrying out watershed protection and flood prevention projects. It will enable individuals and local organizations to borrow funds to meet the non-Federal share of the cost of these improvements. It will also be important in connection with drainage and irrigation improvements which have often found a difficult road to local financing. Direct technical assistance and some financial assistance under the terms of the Watershed Protection and Flood Prevention Act, combined with credit assistance under the Water Facilities Act, should largely alleviate the previous difficulties of rehabilitating small group enterprises as part of general watershed improvement projects. Provision of sound and competent technical assistance in the planning of such projects will, in the first instance, assure the soundness of loans while the economic evaluation required in connection with watershed projects will make them attractive as bankable propositions to many local bankers who have heretofore hesitated to grant credit because of the long record of default on the payment of loans and bonds of poorly-engineered small drainage and irrigation enterprises. Loans under the Water Facilities Act, as heretofore, will be made or insured through the Farmers Home Administration and information regarding them may be obtained in any of the field offices of that agency.

Section 175 of Internal Revenue Code of 1954

Section 175 of the Internal Revenue Code of 1954 gives every promise of providing a large incentive to the more rapid application of soil and water conservation practices.

Under Section 175, many expenditures incurred for soil and water conservation, which formerly had to be capitalized, may now be treated as expense and will be allowed as deductions from gross income. *The amount deductible in any taxable year shall not exceed 25 per cent of the gross income derived from farming during the taxable year. However, if the total of expenditures treated as expense exceeds this 25 per cent in any taxable year, such excess expense may be carried forward and deducted in succeeding taxable years providing the total amount deducted in any succeeding year does not exceed the 25 per cent.* Items that may be treated as expense include expenditures for treatment or moving of earth, including but not limited to leveling, grading, terracing, and contour furrowing; the construction, control, and protection of diversion channels, drainage ditches, earthen dams, water courses, outlets, and ponds; eradication of brush and the planting of windbreaks. Items that may not be treated as expense are the purchase, construction, installation, or improvement of structures, appliances, or facilities which are subject to an allowance for depreciation under the Code. This will probably be interpreted to include structures of concrete, steel, masonry, wood or other materials for which the reasonable life of the structure may be determined. Of course, the Internal Revenue Service is the final authority on items which can be depreciated and those which can be treated as an expense and in all cases the advice of their field agents should be sought before incurring expenditures for which deductions are to be sought. Another significant provision of this Section is that payments made by a farmer or rancher to satisfy any part of an assessment levied by a soil or water conservation or drainage district are allowable as deductions providing the assessment is for the purpose of making improvements which, if made by the individual farmer or rancher, would be allowable as deductions under the Code. This should be a particular benefit to those paying assessments levied by flood control or drainage districts, for example, to cover the cost of construction of earthen dams, drainage channels, and similar improvements.

A Look Ahead

We are fortunate that we are entering the expanded watershed protection phase of the Nation's conservation program with a background of sound experience to draw upon through the seventeen years of experience in local-state-Federal cooperation in the soil conservation district program. The principles embodied in watershed legislation, both federal and state, simply extend the basic concept of soil conservation districts, namely, the preeminence of local initiative and responsibility with teamwork between local, state, and Federal agencies involving Federal technical and financial help only when local people request it. The need for Federal technical help and other assistance to supplement local and state endeavors in the field of conservation is generally recognized as being in the public interest.

The watershed approach, utilizing the new authorities available, simply provides the mechanism through which most of the land and water problems of a watershed can be solved by the local people living in that watershed. The new watershed protection program clearly should not be looked upon as some miracle coming out of the Federal Treasury. If it is successful, it will be because local people, working through their local organizations with the help of their state governments, are determined to assume and maintain the principal initiative and bear a major share of the cost of the job, seeking from the Federal government only that additional assistance which is beyond their technical and financial capabilities.

One of the most significant experiences that has come from the small watershed approach to date in the eleven authorized watersheds and in the pilot projects *has been the incentive which a community undertaking provides to nearly every member of the community in pushing further and faster with his own individual efforts. Experience shows remarkable increases in the amount of soil and water conservation practices applied by individual farmers and ranchers after they have become members of a team trying collectively to get a needed watershed improvement plan accomplished.* It is our opinion that in many instances no amount of technical and financial assistance to individual farmers and ranchers would have resulted in as much applied practices as has the incentive of teamwork. Therefore, I would like to emphasize a conclusion reached by some of those closest to watershed programs, namely, that *the greatest need of farmers and ranchers today is not just more hours of technical or other personal assistance to each individual farmer and rancher, but more help in planning for joint community undertaking the effect of which is to create an incentive for each member of the community.* In another area of society this spirit is termed *"civic pride."*

On the other hand, it is most important to emphasize that the watershed approach does not subtract in any sense from the approaches now being used in achieving soil and water conservation. The watershed approach makes it more essential than ever—physically and economically—for the farmer to use his land within its capabilities, treat it according to its needs, invest in his soil as if it were a bank for storing up fertility, and managing his grass and woodlots to sustain their yields. In doing so he should have the timely provision of adequate technical help and such financial assistance or other aid, such as income tax expensing, as will put his job of soil and water conservation within his personal capabilities.

13 SCDs Means Good Luck for San Diego County, California, Farmers

JACK C. ADAMS

Agriculture has long been a stiff backbone in the economic strength of San Diego County, California. More than 200 different crops are grown there. In production of avocados alone, San Diego holds the world's championship. Its contribution in citrus fruits is a keystone in the state's whopping big production in this line. Thirteen soil conservation districts are working with 80 per cent of San Diego's agricultural land and 90 per cent of its farms . . . protecting and expanding the industry, an 83 million dollar business for farmers in 1953. Below, the head of the county association representing the 13 farmer-organized and farmer-controlled SCDs, tells how the work is moving.

SAN DIEGO COUNTY, California, farmers are not the least bit superstitious or uneasy because they have 13 soil conservation districts. There are a lot of them, 3,284 cooperators on more than a half million acres, and they figure that they are lucky, considering the wide range of good results that they have received from these farmer-organized and farmer-operated units of state government.

San Diego districts have been organized since 1941 when San Marcos SCD, third in the state, was born, and an average of one a year has been added. Agua Buena, the baby of the family, arrived a year ago. Altogether the 13 districts represent 1,886,000 of the total 2,725,000 acres in the county. Most of the land, that is not 'in', is held in military reservations. The districts now include about 80 per cent of the agricultural land in the county and about 90 per cent of the farms.

Jack C. Adams is President San Diego Association of Soil Conservation Districts; Director of Upper San Luis Rey SCD; Member California State Soil Conservation Commission.

From the start, districts have expanded and taken in additional territory. Twenty annexations have been completed, most of the land involved in these enlargements having been those that were excluded at the beginning, by request of the owners. Size varies from 18,000 to 385,000 acres because they organized on a community basis, and usually are smaller than those launched elsewhere.

"Districts sure have proved their worth," Robert Pankey, Vice President of the San Diego County Association of Soil Conservation Districts, comments. The association, first of its kind in California, was formed in 1944 for the purpose of exchanging information concerning administration and operations, effecting cooperation between districts, promoting the welfare of districts and encouraging participation of city, county, state and federal agencies and other organizations in soil and water conservation work. It meets quarterly and has been vigorously active since the kickoff.

When a county organizes in this intensive way, to promote soil and water conservation, it usually means that

Figure 1.—Citrus and avocado orchards at the Ben Needham Ranch near Bonsall, San Diego County, California. Diversions, established on the contour, snake across the long and steep slopes to slow-down the run-off that sweeps down from the mountains, and lead it into safe outlets.

agriculture is big business there. And that is just what San Diego County, California, farmers have—an $83,962,-736 business according to the 1953 crop report of Dean F. Palmer, the San Diego County agricultural commissioner.

The income stems from the production of more than 200 different types of crops—tomatoes and avocados, to eggs, milk and cream and olives, paprika, carrots and honey. Altogether 1953 production represented $14,283,-670 in fruit, $18,969,025 in vegetables, $42,601,585 in livestock, $2,447,956 in field crops and $5,660,500 miscellaneous. With avocado production representing $5,700-000 of the $5,778,422 value of subtropical fruits, it brings the world championship in this line to San Diego.

Conservation Practices Important to Citrus Industry

San Diego's $6,285,469 in citrus production, with lemons and oranges leading the way in that order, also bulks importantly in the dollar value of California's No. 1 food crop, citrus being second only to cotton in California agricultural marketings. In California the citrus industry gives direct economic livelihood to more than 100,000 persons. Sunkist Growers, marketing cooperative, alone represents 12,400 grower-members operating through 158 independent packing house cooperatives. Last year Sunkist sold $172 million dollars value in fresh citrus fruits and citrus canned and frozen products. This was $6,000,000 more than in 1952.

The leading part that conservation of soil and water plays in rolling up production signs like those above, is spelled out in what 3,284 cooperators in the 13 San Diego districts have done in establishments on their farms. In totals that march shoulder to shoulder with production dollars, they have established such items as:

46,000 acres of contour farming
34,000 acres of cover cropping
25,000 acres of crop rotations
59,000 acres of crop residue management
1,400 acres of strip cropping

From another angle in their operations these district farmers have marked up these achievements:

165,000 acres of range management
30,000 acres of range and pasture seeding
38,000 acres in irrigation systems
31,000 acres of irrigation management
293 irrigation reservoirs
317 miles of diversion ditches
862 dams
266 stockwater ponds, and
18,000 acres of clearing

Use of specific practices varies considerably from district to district. For example, contour farming is largely applicable in the grain growing areas of the central part of the county. Rotations and diversion ditches apply generally in the same area and for the same land use.

Figure 2.—Under-tree sprinklers at work in San Diego avocado grove.

Along the coast, in the temperate areas, where subtropical fruits are grown—particularly avocados—the most intensive programs are under way. In the avocado areas, districts provide considerable help to land owners because they need guidance from the first step in clearing brush land to the final details in laying out the orchard and installing the irrigation system.

In this temperate zone, around Fallbrook, Vista and Escondido, there are more than 13,000 acres planted to avocados and other subtropical fruit especially adapted to the mild climate of the coastal belt.

The districts' conservation program for avocado orchard management is basically as follows: laying out of the irrigation system, with a permanent pipe installation to each tree, with an under tree sprinkler. A native or seeded cover is allowed to grow during winter months, when the area's rainfall occurs. No cultivation is practiced. During spring and summer months, the cover crop is mowed to provide a protective mulch to conserve water and to afford erosion control when winter rains begin in the fall. Fertilizers and manure are applied to trees and cover crop as needed. Under this conservation orchard program there is no erosion problem on the slopes, which are best adapted to avocado growing.

Water Is a Limiting Factor

In the past, agricultural development in San Diego County has been restricted largely by limited local water supplies. It has expanded during the past four years as a result of import of Colorado River water. A second barrel bringing more Colorado water into the county was completed in October 1954.

Many areas in the county have formed, or are forming, water districts in order to get additional water. When it

Figure 3.—*Left.* Here are 1,800 acres of tomatoes, planted under hot caps. The sloping hillside in San Luis Rey SCD is typical of the frost-free land on which cooperators in San Diego's SCDs produce off-season crops. *Right.* Ten acres of contour planted Valencia oranges on 10 per cent slope, with cover crop of oats and vetch (annual).

becomes available much of the ideal brushland in frost-free locations is cleared and planted to avocados, citrus and many of the so-called specialty crops. This expanding land development has greatly stimulated the district's soil and water conservation programs. Because the climate is delightful, many people are moving into the county to live, and to develop a small farm or ranch. Each new owner requires considerable technical assistance from the district; many have no farming experience.

Distribution of production in the county is based largely on the physical features. There are four different general areas in addition to the narrow temperate climate strip along the Pacific coast.

Another strip paralleling the ocean, but inland from 10 to 20 miles, is classified as a semi-temperate zone. Higher elevations there are relatively frost-free, as is the main area devoted to production of citrus, avocados and off-season truck crops.

Further inland there are bench lands where summers are somewhat warmer and winters cooler. This is a kind of intermediate area devoted to production of grains and beef cattle.

Still further back from the coast are the mountain ranges which have a more severe climate. Apples, pears and beef cattle are principal income producers there.

Beyond the mountains, to the east, the 6,500 foot elevations drop sharply into a desert area briefly identified as Borrego Valley. Of late, water has been developed there from an underground source, and this desert area is fast becoming known for such argicultural enterprises as alfalfa, cotton, dates and cut flowers production.

The great variation in San Diego's climatic zones makes possible the production of more than 200 different types of crops. Average rainfall is quite variable in the county, with a low of three to four inches annually in the desert section, and a high in excess of 50 inches in the mountains.

Success of the 13 San Diego soil conservation districts represents more than organized cooperation between farmers. It involves technical and other assistance provided by Soil Conservation Service and the help of Forest Service in four districts where national forest lands are included in districts. It includes informal assistance in weed and rodent problems from the County Department of Agriculture through the Agricultural Commissioner, and the cooperation of the State Division of Forestry in technical advice on suitable sites to be cleared under the controlled burning program. And, from the Division of Fish and Game, there comes assistance by providing fish for the stocking of ponds constructed by district cooperators, along with instruction in management of these ponds.

All of this has been brought to San Diego's farmers through the programs of their 13 soil conservation districts. Additionally, as very important aids in San Diego's farmers' advance all along the line, there is the support that their districts have attracted from many individual and private enterprises—forces of business, commerce and industry in the front ranks of which are the powerful new heavy industries now springing into great prominence in the area. *Districts also have the assistance of organizations of youth, men and women, backing of veterans, and the help of schools, newspapers, radio and TV in spreading the good news that soil conservation districts, and the rapidly growing ranks of voluntary farmer-cooperators, are doing a bang-up job in expanding and protecting San Diego agriculture, a community backbone.*

Landlord-Tenant Cooperation Gets More Conservation on the Land

JAMES J. WALLACE

This is the story of how soil conservation plans were successfully carried out on a group of tenant-operated farms. Some of the problems dealt with working relationships between the landlord and tenant. Many human-nature troubles had to be ironed out. It took human understanding in addition to soil and water conservation techniques to get the soil conservation job done on the farm.

AN EFFECTIVE WORKING relationship between landlord and tenant to cultivate a partnership is the key to achieving successful tenant farming. Both the owner and the renter generally have as their objective to maximize their net earnings from the farm for the period of time they expect to be interested in the farm. Successful farm management to achieve this objective requires the conservation and most effective use of *all* available resources. This includes not only land, but also working capital, labor, the personal ability of the operator, the managerial ability of the landlord, and the available markets; also an appreciation of human values. A manager or landlord cannot long stimulate an intelligent tenant to maximize effort without helping to provide good living conditions for the tenant's family. The money making goal alone is not enough.

Thus, a basic philosophy of human relationships must exist. The intelligent use of the human resources of both landlord and tenant must go along with the application of the land use capability concept in order to secure more widespread application of conservation on tenant-operated farms.

This paper by James J. Wallace, a member of the SCSA, was presented at the Ninth Annual meeting of the Soil Conservation of America held in Jacksonville, Florida, November 17, 1954. Mr. Wallace is manager of the Iowa State College Agricultural Foundation Farms with headquarters in Ames.

The Iowa State College Agricultural Foundation was organized in December, 1937. It is dedicated to the betterment of Iowa farm people. The Foundation was made possible by a gift from C. R. Musser of Muscatine. The original grant included nine farms and an endowment of $100,000. Later three more farms were added.

Musser, as a farm owner, had observed an alarming depletion of soil and human resources on Iowa farms. He enlisted Iowa State in a project to demonstrate what can be done about such things as making farming a more profitable and satisfactory way of life, maintaining the product value of Iowa farms, and increasing the public confidence in ideas coming from agricultural colleges. Musser hoped, too, that the farmer could be taught to solve his own problems, with less reliance on public subsidy, and that farming could be made sufficiently attractive so that our best adapted rural citizens would continue to follow farming as an occupation.

Tenants Have Improved Their Security

The Foundation has been operating 12 distressed Iowa farms as farm management demonstrations. This is contrasted to "model" or experimental farms. They are operated by tenants under livestock-share leases. They have demonstrated that soil conservation is profitable in a well-balanced program. They showed an average increase in net farm income per farm from $38 to $3,298

Figure 1.—Contour strip cropping on a formerly eroded, depleted and partially abandoned field. The landlord made capital investment in lime, fertilizer and waterway seeding. The tenant did the work and used his own equipment. Farm production increased and net income was assured.

Figure 2.—*Left.* A tenant using farm equipment to "push in" a gulley for the establishment of a waterway. *Right.* This scene shows a barnyard badly eroded.

while the Iowa price index of farm products increased 188 per cent.

Meanwhile, the tenant operators have bettered their security of tenure and their living conditions through good landlord-tenant relationships and improved earning power. In 1949 the first of these tenants purchased a Foundation farm with profits which he had realized while operating under the guidance of the Foundation.

Two examples are used to illustrate how this program operated. Here is the financial result of one of those farms.

Bates Foundation Farm

	1938	*1947*
Price index	108	311
Landlord's net income	$157	$2,354
Tenant's net income	$647	$4,705

I want to give you some of the details of the reorganization of this farm and some of the lessons we learned in the process.

Before this farm was turned over to us the former owner tried to sell it. The farm was priced at $12.00 per acre. It contains 160 acres. But none of the neighbors wanted it at that price because of the run down condition of the soil, the buildings, and the fences.

We followed the usual routine of testing the soil, using lime and fertilizer where indicated. We gradually repaired the buildings and fences as the farm income would permit. Active gullies were filled in and seeded down. Terraces were put in where needed. Coutour farming was put into effect. Much of the unproductive permanent pasture was put into a rotation. We maximized acreage of the high-profit crops, corn and alfalfa. A new poultry house was built for $175 and a poultry flock established. A grade Guernsey herd of 16 cows was assembled. Twelve sows were kept for spring and fall litters.

This was not accomplished in one or two years. Things went wrong. Lots of ideas that look well on paper did not work out. We made progress slowly. Among other problems we had the one of landlord-tenant relationships.

Landlord-Tenant Relations Are Important

The tenant was violently opposed to contour farming. He had many excuses, including a fear of ridicule by the neighbors. I finally made a deal that if he would give the system a fair trial, we would put running hot and cold water in the house. It worked. He found out how the soil and water can be conserved so easily. He would never go back to the old system. He now helps his neighbors to lay out contour lines.

Our lease was the typical kind that goes on forever until one party or the other cancels it. The fact that either party can cancel it any year makes it practically a one-year lease. One day the tenant said: "If I am going to do all this work changing fences, building terraces, working on ditches, etc., you should give me an unconditional five-year lease. As it is, you could put me off this farm any year you want to."

I answered him this way: "You know you can stay on this farm as long as you do a good job and as long as we can work together happily. That termination clause is the only recourse we have. Also, you would want to be able to leave this farm if you had a better opportunity elsewhere. A long lease doesn't get the job done, but our good working relationship does."

Well, he saw the sense of that and the subject was never mentioned again.

Here is another farm of the same size, 160 acres, where we had a similar experience.

Walsh Foundation Farm

	1938	*1943*	*1953*
Index of prices received by Iowa farmers	103	189	273
Tenant's net income	$991	$3,113	$10,883
Landlord's net income	$ 53	$1,655	$ 7,170

There are two reasons why the income is higher than on the other farm. The soil is better. And we discovered the tenant operator had an unusual capacity to learn how to manage livestock.

Through encouragement and suggestion from us he has gone a long ways. We helped him to assemble the things he needed to do a good job with hogs. He now raises about 600 pigs a year on this 160-acre farm. And he does a good job. He has had all the troubles in the book and whipped them all, one at a time.

Soil erosion is well under control now and the soil is getting more productive every year. This farm and this man have both just about reached the limit of their capacity.

Here is one idea I would like to leave with you. And I feel this is probably the most important lesson we have learned.

Soil conservation is one part, an important one, of a larger, broader problem. The people living on these farms want to live the good life. The landlords who own farms as an investment want to maximize their net income for the time they expect to be in possession. They can accomplish their objectives by making the most effective use of the soil, yes, but also of their working capital, of their labor, of their markets, and of the other resources available to them.

How to Get More Conservation on Rented Farms

Now what can *farm managers* and *farm landlords* do to get more conservation on rented farms? Here are a few positive suggestions:

We must keep informed on research which can guide us in the proper use of soil.

We must pass these new facts on to the tenant operators and others we work with toward the achievement of our common goals.

We must use encouragement for the backward tenant to use his personal ability to full capacity.

We must make these farms more productive and livable, thereby increasing our bargaining power to attract the best tenants, and to encourage top performance of these tenants on the farms.

We must use this same bargaining power to use on tenants who have a short time preference.

We must give these tenants as much security of tenure as we can, within the framework of our objectives. A short lease and a long tenure have proven to be good business.

What can the *tenants* do about these problems? There are several things to be considered.

They should keep informed of the latest information coming out of our agricultural experiment stations.

They should encourage a close working relationship with their landlords and keep feeding facts and information to the uninformed ones.

They should do the best job of farming they know every hour of every day. This is the best road to an opportunity to work a better farm with a better landlord and eventual farm ownership.

What can *educators* and others do who are in the professional field of the soil conservation movement? I offer these for your consideration:

First, think and talk in terms of the real objectives of farm owners and farm renters.

Give full consideration to the limitations of the finances and personal ability of these people. Don't push them too hard.

(Continued on page 47)

Figure 3.—*Left.* A herd of fine dairy cattle grazing on improved alfalfa—brome grass rotation pasture. *Right.* A field of contoured corn on a formerly low productive Iowa farm.

Humid Area Irrigation

TYLER H. QUACKENBUSH

Irrigation is rapidly becoming an important farming practice which affects the entire agricultural economy of the humid areas of the United States.

Periods of soil moisture deficiency that will result in a serious reduction in crop yields occur with a much greater frequency than is generally believed to be the case.

Research and practical experience have shown already that, in order to be successful on a long-time basis, humid area irrigation must be an integral part of a complete water management program on the farm, combined with high soil fertility and good conservation farming practices.

THREE CONSECUTIVE DROUTH years have caused many changes in farming operations in the eastern and southern United States. Many farmers from Florida to Maine have installed irrigation systems. It is getting difficult to find a farmer who has not at least thought of irrigation as a means of preventing severe crop losses due to lack of adequate rainfall.

Because most of the expansion in humid area irrigation has taken place since the last census, accurate figures indicating the total growth are not available. Individual surveys in several eastern states tell part of the story, however. For example, in Virginia the 1949 census showed 2,817 acres were being irrigated. A survey in 1950 showed 6,336 acres under irrigation, and a similar survey in 1953 indicated that 12,239 acres were being irrigated—practically a 100 per cent increase from 1950 to 1953. It is estimated that 110 additional systems were installed in the first six months of 1954 to irrigate approximately 4,400 more acres. This brings the irrigated land in Virginia to over 16,000 acres—a 13,000-acre, or over 400 per cent, increase in 4½ years.

Data from Missouri show similar trends. The 1949 census showed 2,089 acres being irrigated. A 1953 survey showed approximately 11,248 acres under irrigation, or an increase of about 9,000 acres in four years. That is a gain, percentage-wise, of almost 440 per cent.

I believe these figures are fairly indicative of the phenomenal growth of irrigation in the eastern and southern United States.

What has brought about this large scale expansion of irrigation in the high-rainfall areas? The severe drouth periods of the last three years have undoubtedly been a major factor. The advent of quick-coupling, lightweight aluminum pipe has certainly made irrigation much easier, and the increasing demand of the American consumer for crops of high quality has emphasized the need for soil moisture control. The high costs of crop production have also indicated a need for the more stable farm economy that can be obtained with irrigation.

The installation of these irrigation systems has produced many outstanding results during the past few years. Tests made at the Georgia Agricultural Experiment Station in 1952 showed that nonirrigated tomatoes averaged 6,452 pounds per acre, while irrigated tomatoes averaged 18,915 pounds—an increase of 193 per cent. Also in Georgia: "Irrigated plots in 1952 produced 2,534 pounds of seed cotton an acre, while nonirrigated plots yielded only 742 pounds per acre." And from Lewisburg, Tennessee: "During the two years of the test, the irrigated half of the pasture averaged 54 per cent more milk production per acre and 38 per cent more income above cost than the nonirrigated plot. This amounts to an increase in net return from the irrigated pastures averaging $115.53 per acre."

A study of 29 irrigated tobacco farms in 21 counties of North Carolina in 1952 showed an average increase in net profit of $161.48 per acre; likewise, in 1953 a similar study of 48 farms in 22 counties showed an increase in net profit of $346.18 per acre.

Many similar results have been obtained throughout the South and East during recent years. Results of these short-time studies, most of which have been conducted in rather severe drouth years, certainly make good headlines. Until they have been continued over a longer period of time, including years of normal and above normal rainfall, however, they do not give us the answers we really need.

Why Irrigation Is Needed

In the absence of results of research that has been conducted over a longer period of years, the true potential of irrigation in the humid areas seems best reflected by studies such as those made by D. B. Krimgold at Seabrook, New Jersey. Krimgold computed the soil moisture deficiencies that occurred on the light soils at Seabrook during the period 1931 to 1952, which was selected as typical of the 67-year rainfall record. He found that:

1. Soil moisture deficiencies occurred in each of the 22 years studied.
2. Moisture deficiencies that would result in a serious reduction in crop yields occurred in 50 per cent of the years studied.
3. The number of days with moisture deficiencies ranged from 42 in 1934 to 135 in 1949.

Dr. Robert L. Green conducted a similar study, based

Tyler H. Quackenbush is an irrigation engineer for the Soil Conservation Service, with headquarters in Washington, D. C. *Mr. Quackenbush presented this paper at the Ninth Annual Meeting of the Soil Conservation Society of America, held in Jacksonville, Florida, November 17, 1954.*

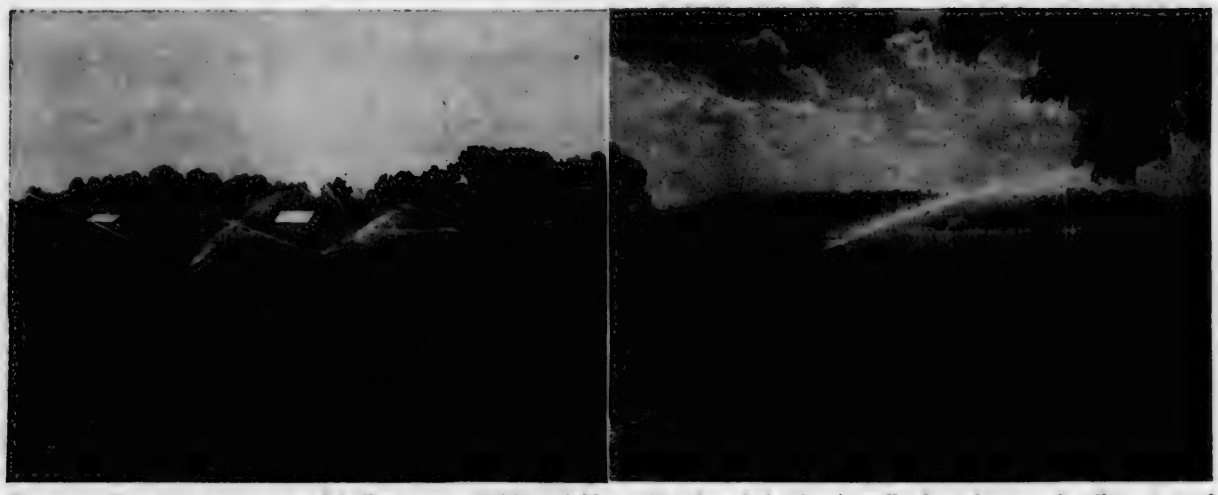

Figure 1.—Irrigating tobacco and ladino pasture with sprinklers. Sprinkler irrigation is well adapted to nearly all crops, and the varying conditions of soil and topography found in the humid areas.

on 18 years of records at Shreveport, Louisiana. His conclusions were:

1. "Drouth periods have occurred with a far greater frequency than is generally believed to be the case.
2. "Where good quality water is available on farms, supplemental irrigation would be beneficial to crops at least once in each growing season and more generally three or four times."

Comparable results have been obtained in similar studies in West Virginia, North Carolina and Minnesota.

Practical experience in areas such as southern New Jersey, where commercial truck farms have used irrigation for many years and found it profitable, has verified these conclusions.

It should be pointed out that in order to reflect the true need for irrigation, drouth frequency studies must be specifically related to the depth and water holding capacity of the soil. A period of moisture deficiency that may seriously affect a shallow rooted crop on a coarse sandy soil will not necessarily cause damage to a deep rooted crop on a good loam soil with high water holding capacity.

Humid-area irrigation certainly should be more than just a "crop insurance," used only to "pour on" some water during a dry spell and save a crop. The fact that this procedure has paid good dividends in many instances during the recent severe drouth years has made it difficult to convince a large proportion of the farmers that "good irrigation farming" is necessary for maximum production on a long-time basis.

The present widely accepted concept of using irrigation as an "insurance" against drouth will do very little in the long run towards increasing crop production. Many farmers have operated on this basis and invariably they provide "too little and too late." They start irrigation too late and in order to cover the ground in a hurry, they apply too little water. As a result, crops suffer and water is wasted.

Actually, irrigation in the humid areas should be one of the final steps in a complete soil and water management program on a farm.

The farmer who buys an irrigation system with the idea that it will be the cure-all for his fertility and erosion problems is due for a rude awakening. In many cases, irrigation systems are installed on farms that are not ready for irrigation. What these farmers need to do first is to develop a conservation plan, not an irrigation plan.

For example, irrigation may increase the erosion hazard. A hard rain on a field that has just been irrigated will produce more runoff than if the field had been dry. Adequate provisions must be made to control erosion on such lands. What about drainage? Irrigation will aggravate the drainage problem on poorly drained soils. If it is improperly used, irrigation may create drainage problems on formerly well-drained soils. Good drainage definitely should be a prerequisite to the installation of an irrigation system.

Soil Fertility Concerns Irrigation

Soil fertility is a matter of major concern to the irrigation farmer. *With the proper use of irrigation water, soil fertility—not soil moisture—becomes the major limiting factor in the production of crops.*

Studies at Ithaca, New York by the Department of Agriculture and the Cornell University Agricultural Experiment Station in 1950, 1951 and 1952 showed that the forage yield on nonirrigated "high fertilization" plots was consistently greater than yields on irrigated "normal fertilization" plots. This is a good indication that in many

(Continued on page 31)

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On August 10, 1954, we purchased an Austin-Western Super "88" six-wheel drive and steer Power Grader to maintain our approximately 65 miles of open canals and ditches. To remove weeds and grass from ditch and canal banks without extensive spraying and burning, we had a special 12-foot blade extension, with combination hydraulic and cable control, fabricated and installed on the end of the standard 12-foot moldboard. The Super "88" Grader with power drive on the front wheels as well as the rear wheels, along with both front wheel and rear wheel steer, is a very adaptable and maneuverable machine where working space is often at a premium along canal banks and installations.

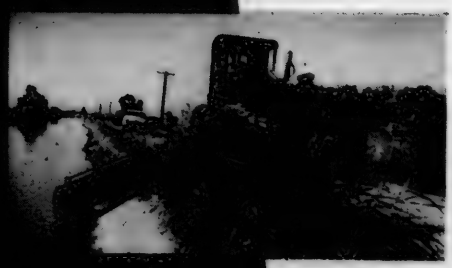
Prior to buying this machine, we were doing extensive spraying and burning, and also used a large crawler tractor with side boom and blade. Such an operation was extremely costly, and also required us to use a tractor truck and low bed trailer to move the equipment from job to job; while the Super "88" with a speed of approximately 17 mph is driven to and from our locations, eliminating many additional man-hours.

As of now, we can recommend this new motor grader highly, and feel that it is a fine machine for maintaining irrigation canals, ditches and levees; as well as for road maintenance and all-around grading.

Very truly yours,

Bernard L. Miller

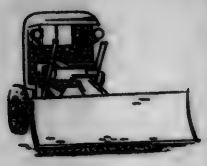
Bernard L. Miller, Supt.



ecial 12-foot extension, designed by the Corcoran t, hinges where it is bolted to the moldboard, raised or lowered to the desired ditch-cleaning y a hydraulic ram mounted above the hinge point. The forward end of the extension is supported by a cable leading to the scarifier lift shaft, which pulls the extension in and out from the grader to get the desired depth of ditch-cleaning cut.

No single machine will handle so many different kinds of soil and water conservation jobs so easily, quickly and economically as the Austin-Western Power Grader with its exclusive All-Wheel Drive for maximum traction in soft or rough ground; exclusive All-Wheel Steer for short turning and fast maneuvering, and powerful bulldozer attachment.

BLADE AND BULLDOZER



TERRACES AND DIVERSIONS TO BUILD

With its exclusive All-Wheel Drive and All-Wheel Steer, the Austin-Western Power Grader does a beautiful job of building terraces, regardless of the nature of the soil. With every pound of weight on a driving wheel, the Grader is perfectly at home on slopes that would be far too steep for ordinary graders. Rear Steer makes it possible to carry an unbroken windrow around short radius curves, and can also be used to offset the frame; moving the windrow farther and faster, and compacting the earth in the ridge as much or little as desired.

GULLIES TO FILL

Another place where the tremendous earthmoving ability of the A-W Power Grader makes it possible to do the work rapidly, at a cost well justified by the benefit to the land. After the bulldozer has pushed-in the banks, the blade shapes and finishes the waterway.

BRUSH TO CLEAR

Clearing an area preparatory to cutting a diversion ditch. Powerful bulldozer and grader blade provide the one-two punch that gets the job done easily and quickly. There is much work for the bulldozer in almost every *farm plan;* many odd jobs for it on every farm.

DITCHES TO CUT

With its exclusive 6-Wheel Drive and 6-Wheel Steer, the new Super "88" Power Grader is especially recommended for work in soft or sandy soils where flotation is an important consideration . . . as on this job of cutting V-type irrigation ditches for cotton near Phoenix, Arizona.

In the Delaware field at the right, lateral drains of the V-type, spaced less than 100 feet apart, are necessary. The Grader makes short work of the construction of these shallow ditches, with their flat side slopes.

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☐ I am interested for my farm
☐ I am interested for my SCD

Name _____

Address _____

Humid Area Irrigation

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cases good farm management alone will increase yields more than will irrigation coupled with *poor* management.

The University of Illinois recently completed a five-year study on the irrigation of pasture for beef cattle production. The results of this investigation showed that irrigation did *not* pay. Yields from the irrigated pasture were consistently more than those from the nonirrigated pasture, but the increase in beef production was not enough to pay the cost of irrigating.

In the analysis of the results of this test is the statement that "It is reasonable to expect pasture irrigation to be economically feasible when better fertility treatments and better grazing management practices are used."

The difference between profit and loss in this case was management and fertility—a good example that water alone will not do the job.

What are some of the advantages of irrigation in the humid areas as it affects soil conservation? Among them are:

1. Adequate and efficient use of irrigation permits much better utilization of the land in accordance with its capabilities. Crops that permt erosion damage can be confined more nearly to the classes of land on which erosion is less severe. Increased yields per acre can be obtained through high fertility and adequate moisture. Use of the more erodible lands for grass and legume production, therefore, will be more feasible and practical.
2. Sprinklers are well adapted to starting new seedings, thus assuring an adequate cover on eroded areas, grassed waterways, earth embankments, etc.
3. Maximum use can be made of fertilizers by irrigating immediately after their application, or by applying them in the irrigation water.

Proper Design and Operation Needed

Several other factors must be considered in order to assure profitable irrigation in the humid regions. Two of the most important are (1) the proper design of the system to fit the farm and (2) the proper operation of the system in accordance with the standards of the original design. Both proper design and proper operation are essential to success. If either is neglected, the other cannot succeed.

The design of an irrigation system, either surface or sprinkler, is an engineering job. Many complex factors, from pump efficiencies to the waterholding capacity of the soil, must be considered. The American Society of Agricultural Engineers and the Sprinkler Irrigation Association have developed and published a list of "Minimum Requirements for the Design, Installation and Performance of Sprinkler Irrigation Equipment." These minimum requirements, combined with the "local irrigation guides" which are prepared by the Soil Conservation Service in cooperation with the Agricultural Research Service and the various state colleges and experiment stations, provide the basic criteria for good irrigation system design.

Figure 2.—The leaves tell the story! The one at the left is from the irrigated part of the field. Compared with the other it shows the benefits of using moisture and fertilizer as a team.

Many of us are inclined to think only of sprinklers when we speak of irrigation in the humid areas. Sprinkler irrigation has played, and will continue to play, a very large part in the growth of irrigation argiculture in the East. But we should not overlook the fact that nearly 1,360,000 acres in the humid areas of Arkansas, Louisiana, and Florida are irrigated by gravity or surface methods—that is, methods in which the irrigation water flows over or is ponded on the surface of the ground. The irrigation of rice, which makes up a large part of this acreage, presents many problems.

Conservationists working on irrigation should have a good knowledge of the limitations and advantages of both surface and sprinkler irrigation. I believe the ultimate solution is the proper use of both methods, using each where it is best adapted.

Assuming that adequate irrigation water is available, the use of surface or gravity irrigation in the high rainfall areas is limited primarily by two factors, topography and soils. Where these factors are satisfactory, border irrigation or furrow irrigation can be designed to function quite satisfactorily.

Generally speaking, the natural topography of the eastern United States is not well suited to the use of border or furrow methods. Most sites will require land leveling, and since the soils are predominantly shallow, land leveling would have to be done with caution so as not to expose large areas of infertile subsoil. Furthermore, shaping the surface of such irregular soils for irrigation by surface methods is likely to be too costly.

Figure 3.—When surface soils are deep and topography not too irregular, the land can be leveled for surface irrigation. On land such as this, you can *"kill two birds with one stone"*— that is, make the job provide for both irrigation and surface drainage.

In areas where the soils are deep enough for leveling and surface drainage is a problem, such as the Missouri River bottomland in Iowa, a well-designed land-leveling job will kill two birds with one stone. Both good surface drainage can be provided and uniform, efficient application of irrigation water can be attained as the results of one leveling operation. The slope cannot be great enough to cause erosion by rainwater, nor less than is needed for surface drainage. But between these limits a leveling job can be done that will suit the purposes of both irrigation and drainage.

Many well-designed irrigation systems have failed to do their job because they were not operated properly. Adequate instructions in system operation are necessary if an efficient job is to be done.

The old and widely used practices of irrigating when the crop changes color, when the leaves show some wilt, or at so-called critical stages of growth, are not the right indicators to guide the proper operation of an irrigation system. The farmers must be shown that the procedures involved in successful irrigation are based primarily on the physical properties of the soil—its depth, its intake rate, its water-holding capacity—in addition to the growth characteristics of the plant. We, as conservationists, must emphasize the fact that the *soil* will primarily determine the answer to the two questions, "When do I irrigate?" and "How much do I put on?" The answer to these two questions should be one of the primary goals of our irrigation research program.

Research and investigations to improve irrigation practices have been carried on for about 50 years in the western states. Out of these studies and experience we have learned some basic principles of irrigation that will apply in the eastern as well as in the western states. The basic principles or irrigation agriculture are generally the same, whether it be in a 50-inch or a 5-inch rainfall belt. The primary difference is in water management due to the variation in rainfall. This presents a problem of adapting established procedures to a different set of conditions, in order to bridge the gap between the rapid installation of irrigation systems and the obtaining of results of local research.

Research Is Needed

The most urgent research data needed for the design and operation of irrigation systems in the humid east are:

1. *Soil-Plant-Moisture Relationships*

   Irrigation agriculture involves three basic elements—water, soil, and plants. The payoff is through the plants and the ultimate effort is directed to the establishment of conditions for optimum crop production. A knowledge of interrelationships between water, soil and plants is essential. The soils must be classified with respect to their intake rates and water-holding capacities. The effect of tillage practices and crop rotations on these characteristics must be learned. Plant response to soil-moisture stress must be established. We need more data on the relationships between moisture and fertilizers. Knowledge of the root-zone depths and moisture-extraction patterns of the various crops being irrigated is needed.

2. *Irrigation-Water Requirements*

   Before a water supply can be provided, or the system for conveying it determined, the quantities of water needed to meet the crops' requirements must be known. How much water must be sup-

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San Fernando Valley SCD Active In Local Flood Control Program

FRED A. HAUGHTON, JR., AND CHARLES F. BOND

California's San Fernando Valley is tremendously rich in attractions that annually pull thousands of people there from all over the country, to visit, or to work and live. It also has features that are not attractive, like flood water troubles that raise hob with about everything and everyone. In team work that reaches into every nook and corner of the area, something is being done to end the oft recurring menace. Millions are being poured into the work and results are piling up in the cities, like Los Angeles, and out in the country. The San Fernando Valley Soil Conservation District is playing a major role in this job. Below the authors tell you about it.

SAN FERNANDO VALLEY, a 210-square-mile basin north of Los Angeles, has a beautiful Mediterranean-like climate, with cool but sunshiny winters, and warm and dry summers . . . and flood water troubles.

Through teamwork, in which local, city, county, state and federal funds and facilities have been put to work, farm, urban and city folks are seeking to control their troublemaker by reducing, or totally eliminating, his frequently recurring visits. Millions of dollars in public and private funds are being spent in the effort, and it is paying off because these southern California people now see that they are getting the upper hand with their "bad boy" without losing any of his good and much needed values.

For three-quarters century, the annual rainfall in the watershed has averaged 16.8 inches, with wide variations in this annual fall. In 1941, for example, 37 inches of rain fell, but in 1948 only 7.8 inches were recorded. That's on the slopes and over the flood plain. Up in the mountains that rise from this plain, annual rainfall is about 30 inches.

Most of this rainfall in the 135,000-acre drainage area occurs in high intensity storms, one to five inches of downpouring in an hour, in areas where the infiltration rate of the soil is only two-tenths of an inch per hour. This means that flash floods are common in dry, as well as wet seasons.

Out in the areas above the flood plain, the run-off problem is intensified because the many slopes are steep and most of the vegetation is not sufficient to protect the soil and keep it from washing away. Almost every year forest fires, sweeping over large areas, have added to the problem by denuding the land and opening wide the gates for the sweep of heavy rainfall. After each hard storm, debris and soil, washed down the slopes, can be found piled up on the flat-land, in streets and yards of urban and city folks, and in channels that are supposed to carry excess run-off away. These channels often become clogged and cannot serve their full purpose.

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Figure 3.—Out in the San Fernando agricultural area, on gentle slopes like this, you'll find great acreages of vegetables planted on contour. These are early tomatoes.

In the general area, some of the mountainous land is federally owned, but in the San Fernando Valley this applies only to the San Gabriel Mountains in the northeast part of the watershed. Here work has been done in attempting to vegetate the area, and Forest Service has developed programs that improve fire protection facilities. Altogether, progress is being made in reducing the fire hazards. On private lands similar measures have been taken on a smaller scale, but forever, likely, there will be forest fires.

Flood Waters Are Destructive

The San Fernando Valley basin is drained by the Los Angeles River, which flows easterly along the southern edge of the valley. It carries little water during the dry season, but often goes on a rampage during the rainy months, November through April, with peak rainfall usually recorded in February. The main tributaries are the Tujunga, Little Tujunga and Pacoima Washes, swollen by flow of smaller washes and creeks.

Water discharged by all of these streams must pass through a small gap at the southeast, where the Los Angeles River flows out of the valley, before moving south across a level plain to the ocean. Here disposal of

Figure 1.—*Left.* In this improved and well protected channel excess run-off from San Fernando Valley storms will move downstream in as orderly a manner as a division of Uncle Sam's crack Marines. This is the Aliso Creek flood channel, looking downstream from Reseda Boulevard. *Right.* Here is how San Fernando Valley flood waters in Brown's Creek, during a 1952 storm, piled up debris and silt in Sherman Way; stalled street cars and busses when they got stuck in the mud.

flood water becomes a complex problem because the city of Los Angeles, and Hollywood, North Hollywood, San Fernando and other highly populated communities, are surrounded by and intermingled with farms and ranches of high agricultural producing acres, dairy herds, beef cattle breeding establishments, and homes of Kentucky thoroughbreds. It is because the troubles move out of the mountains, down over the slopes and across the flood plain and into the villages, towns and cities, and in the woodland and on the best crop-land, that public and private forces have united in a closely dovetailed program that is designed to put the situation under control, from mountains to ocean.

The City of Los Angeles, the USDA Soil Conservation Service and the Corps of Army Engineers are closely cooperating with the Los Angeles County Flood Control District, which has developed a comprehensive plan in which it is working independently and with the Corps of Engineers on major structures and down stream controls. In this program there are provisions for locating areas where excess water may be spread into the underground water supply. Putting the Los Angeles River—main outlet—in shape to safely carry the flood load, of course is the major objective.

Outside the city, in the small tributary streams that flow into the Los Angeles River, and on the farm land from which run-off moves into these feeder streams, the Soil Conservation Service and the San Fernando Valley Soil Conservation District are cooperating in the over-all attack on excess water by developing programs designed to control run-off where the rain falls.

This program calls for extensive channel improvement work because in some cases, a short distance away from the canyon mouth, these feeder streams have had no channel. During high intensity rainfalls in the foothills, or mountains, water from these almost channel-less streams has swept across citrus groves, farm yards, paddocks, and cattle yards, paved streets and other highways. People and automobiles have been swept aside by the fierce flow; lawns have been cut to pieces, trees have been uprooted and basements have been flooded . . . lives of many citizens have been imperiled and traffic has been paralyzed. The job is to put all of this flow under control in the minor, then major streams so that it can be carried safely to the ocean.

Out along the tributaries to the Los Angeles River, the big outlet to the ocean, and in the foothills, on the farms and in the woodland high up the slopes, where the run-off trouble starts, USDA's Soil Conservation Service and the San Fernando Valley Soil Conservation District, a farmer-organized and operated agency of state government, are teamed in a watershed protection and conservation farming program authorized by congressional action. Officially it is known as the Los Angeles Watershed Program, the first of 11 such projects approved by Congress. Work in the tributary streams was started by SCS in 1940 and since 1943 the SCD has been actively participating through work done on farms of its more than 2,600 cooperating farmers.

In this watershed program federal funds are used to put the tributary streams in shape to handle the run-off when it comes. On the farms, the owners and operators are individually paying for the work that each does in establishing practices and installations that will move the water, as free of silt and debris as possible, off his land and into the new, improved and protected channels that lead into the Los Angeles River and the ocean.

Results of Program Are Impressive

To date the Soil Conservation Service has assisted in the construction of more than 20 miles of these improved minor channels in which the carrying capacity ranges from 470 to almost 6,000 cubic feet per second. On farm land from which run-off feeds into these streams, 279 farmers, who operate on 36,089 acres, have established such totals of soil and water conservation farming practices as:

13 miles of stream channel improvements

27,600 acres of rotational and deferred grazing

5,300 acres of pasture and range seeding

500 acres of land clearing

668 acres of irrigation land leveling

640 acres of improved water application

During the six months ending June 30, 1954, San Fernando Valley Soil Conservation District canceled 227 plans and approximately 148 obsolete flood control plans, principally because of suburban housing developments in the valley and the district. Continued conversion of farm land to suburban housing development is rapidly reducing the farming enterprise in the valley.

Figure 2.—Here's a birdseye view of part of the area in which the San Fernando flood control program is being vigorously established. It shows the relative locations city, urban, agricultural areas and mountains. The dark lines mark creek flood channels, completed in 1948 and 1949, just ahead of a disastrous brush fire that denuded the entire Bell-Dayton Creek watershed. This system drains 24,000 acres to form the headwaters of the Los Angeles River.

Altogether nearly $6,000,000 in federal and non-federal funds will have been spent when the program of minor stream work is completed in the San Fernando Valley Soil Conservation District in about 1958. This does not include the cost of the work that farmers have done, or will do, on their own land. The division of the nearly six million dollars will be about $2,500,000 of federal funds and $3,500,000 of non-federal funds.

Apart from all this there are the expenditures that the Los Angeles Flood Control District and the Corps of Army Engineers are making in preparing and protecting the down stream area, and the money that Los Angeles County and the city are expending in other tangents of the program. In the fall of 1952, for example, Los Angeles County voters approved a $179,000,000 bond issue for installation of flood drains. All this is in the general category of safely routing flood water when storms occur.

Construction of waterways, drainage ditches and debris impounding basins, and all the other work that has been done out on the watershed and in the minor and major channels, and the flood drains in the city do not tell the whole story. Additionally, there are the contributions that individuals and neighboring groups of land owners have made in providing rights of way.

Business and industry also have had a hand through contributions made by the Chamber of Commerce, public utilities, and by the city through its engineering work in bridge and traffic management improvements.

And all of this has been done, and is continuing to be done, in the face of a San Fernando building boom. Many hundreds of acres of close-in agricultural land, highly adaptable for metropolitan uses, were not developed over many years because of the flood hazard. Now with the control measures that are being installed, the subdivider is again up to his neck in activity.

Many of the smaller ranches are being subdivided; some into small agricultural tracts where the land owner will have from one-half to two acres. Many acres are going into housing developments, with the normal city lot type of holdings; industrial and commercial developments are springing up over the area. Now one flood channel may cross several streets, run through business areas.

San Fernando Valley is aware of its problem and is working with all people and all agencies and groups in bringing them together in a cooperative protective and development program that is of tremendous importance. Overall it is a good example of how a tremendously big job can be done when there is thorough going team work —farmers, urban and city folks, industry and commercial organizations, local, city, county, state and federal governments, people and interests of all kind, moving ahead, shoulder-to-shoulder.

SCSA Goal: Professional Improvement To Speed Conservation On the Land

ALFRED M. HEDGE

The Soil Conservation Society of America provides all technicians in the field of soil and water conservation a special opportunity to maintain a high degree of professional competence and to broaden their knowledge and understanding of the many complex skills needed in conservation work. Without such a means of coordinating their knowledge and exchanging experiences in a practical way, efforts of professional workers, who must combine their varied skills to assist farmers and ranchers in this field, woud be far less effective. Through the Society's JOURNAL OF SOIL AND WATER CONSERVATION, issued six times yearly; through the annual national meeting; and through participation in the work of the 73 local chapters of the Society, conservation technicians have a good chance to get acquainted with other workers in the field, and to learn and benefit from the latest technical developments.

"LEARNING THE TRICKS of the trade" is an expression often used in connection with training given to new employees. Unfortunately, some employees become so engrossed in learning the tricks they never learn the trade.

Soil conservation as it is encouraged and practiced throughout the United States and its territories is a "trade," not a "trick"—nor even a combination of "tricks." To attain the competence required to assist farmers and ranchers cooperating with their soil conservation districts, technicians in soil and water conservation must have a broad knowledge of soils, agronomy, engineering, woodland management, range management and biology. In addition to all this they must also be able to deal effectively with people.

They must understand how the various technologies can be combined into a useful, practical, and economically feasible system of farming and ranching. To do that often requires the employment of specialized skills within the broader subject matter fields. Thus the knowledge and experience of a great many specialized technicians is combined in the soil conservationist's "trade."

Work of Technical Committees

In addition to the Society's JOURNAL, its annual meetings and its chapter programs, one of the important means of serving technicians in the soil and water conservation field is the continuing work of SCSA's technical committees. Seven such committees, at present, are actively bringing the best available technical information to the membership.

One of these committees, *"The Meaning of Soil Conservation,"* was established to set down a clear-cut statement of just what is involved in soil conservation as a means of furthering a widespread appreciation of its importance. The work of this committee is important to technicians and laymen alike, and its report, published in two issues of the Journal, attracted a great deal of attention among conservationists.

A committee on *"Land Classification"* is dealing with the problems involved in setting up a practical and uniform system of land classification so that all conservation agencies can use similar methods in appraising conservation problems, on public as well as private land.

A third committee is developing methods whereby the progress made in getting the conservation job done can be realistically appraised in each soil conservation district. Suggestions for this activity arising from the work of the committee will be presented to all district supervisors early in 1955.

A committee dealing with *"Social Factors in Land Use"* is being set up because the relationship between the way people live together and the use they make of natural resources is well recognized although not too well understood. It is expected that committee reports on this subject will be of real interest and value.

A report on some of the conflicts involved in use of wet lands has been published in the *Journal* by the *"Wetland Management Committee,"* after several years' work by a group of biologists, engineers, and other professional people who brought their specialized knowledge to bear on a common problem. Considerable progress has been made in assigning values to wet land as a basis for determining its best use, whether it be cropland after drainage, or preservation and further development of the wildlife values inherent in such land.

A committee on *"Watershed Management"* is dealing with a subject that is receiving a great deal of attention nationally. The problems with which this committee deal occur in nearly every state. They are particularly important where public and private ownership is intermingled. They involve research, education, and action on a watershed scale, which poses many new procedures.

The recently established committee on *"Land Utilization"* is making good progress. The problems this com-

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mittee is tackling are those arising from growing conflicts in demand for urban and rural use of land. Reasonable guides are needed for determining the most reasonable choice of land for housing developments, airports, highways, recreational areas, as well as various farm, ranch, and forest use of land.

Plans for next year call for increasing the number of technical committees to enable the Society even better to serve the needs of the profession. They will deal with humus and soil conservation, quality of water, biology and land use, and other subjects. These technical committees of the Society are composed of men who are recognized authorities. They obtain information from research institutions, both governmental and private, from the teaching staffs of colleges and universities, and from the experience and knowledge of practical field technicians. Thus, the Society brings together for the benefit of its members the knowledge and information that will help technicians assisting soil conservation districts to maintain highest professional standards. And in this way, the Society complements the efforts of soil conservation district supervisors in respect to the *whole* conservation job.

Reporting Procedures, Solutions

District supervisors and the technicians assisting them feel justifiable pride in solving successfully the many complex conservation problems with which they are faced. But that feeling of pride is increased, and new challenges are met with renewed vigor, when the opportunity exists to pass on the knowledge and experience gained to others groping for similar answers. The Society provides such an opportunity. The Society's JOURNAL records many successful solutions to difficult conservation problems that have been worked out jointly by district supervisors, farmers and ranchers who cooperate with them, and technicians who assist them. The opportunity to tell about these successes not only adds to the stature of those achieving them but speeds the application of effective conservation measures on the land. THE JOURNAL OF SOIL AND WATER CONSERVATION has become recognized throughout the world for the quality of its technical articles. The accomplishment of technical work worthy of reporting in the JOURNAL makes an important contribution to the total conservation job.

SCD Supervisors Participate

Soil conservation district supervisors (commissioners or directors) bear a heavy responsibility for the conservation work carried out in their districts. They are justly proud of the competence of the technicians who assist them. They are eager to maintain high standards in their conservation work and can look to the Society's technical activities as an important aid in doing that.

In addition, many district supervisors have become members of the Soil Conservation Society of America. They have contributed greatly to the effectiveness of the Society's activities and in return have received assistance in discharging their personal conservation responsibilities.

The Soil Conservation Society of America now has more than 6,500 members, of whom more than 350 work in other countries throughout the world. The fact that this Society is growing more rapidly than any other professional society indicates that it is filling a need felt today by a great army of technicians, research workers, soil conservation district supervisors, and other conservation workers and leaders.

Humid Area Irrigation

(Continued from page 32)

plied depends on many factors, such as consumptive use by the plant, irrigation efficiency, quality of water, method of delivery and rainfall. The water supply and the distribution system must be designed to satisfy both the seasonal and maximum use period requirements.

Until all of this needed information is at hand, however, we must continue to rely mostly on information from the West, corrected in accordance with our best judgment to fit local conditions.

Water laws and water rights, though of extreme importance, will be mentioned only briefly. Existing water laws loom as major obstacles in the path of future irrigation expansion in the 31 eastern states.

Definite action is needed in all states to give the farm irrigator the security he needs. At present, he is not assured that he has a right to use water from a stream for irrigation. His operations may be stopped by injunction, if his actions cause material damage to riparian users below him. Much of the value of his investment may be lost if riparian owners above him decide to draw on his limited supply for irrigating their crops.

The only apparent answer to this baffling problem in the humid areas in the United States is through the establishment of workable water laws by the state legislatures. Until this is done, the irrigation farmers in the humid areas will continue to be groping in the dark insofar as their legal rights are concerned. In some areas, of course, particularly in the coastal plains, there are adequate supplies of water that can be reached by wells. Even in these areas there may be a problem in later years if irrigation should become widespread.

Research Program in Soil and Water Conservation

ROBERT M. SALTER

Robert M. Salter

The Soil and Water Conservation Research Branch of the Agricultural Research Service, United States Department of Agriculture, comprises the research in soils, fertilizers and irrigation previously conducted in the former Bureau of Plant Industry, Soils, and Agricultural Engineering, plus most of the work transferred to the Agricultural Research Service from the Soil Conservation Service in 1952 and 1953. All of the work in States is cooperative with the State Agricultural Experiment Stations. The Branch is organized into five sections. Following is an account of what they do.

Soil and Water Research in Humid Regions

The Eastern Soil and Water Management Section, headed by Lewis B. Nelson, conducts research in the Eastern 31 States and Puerto Rico. It seeks to develop improved practices for controlling soil erosion and water runoff for efficient irrigation and drainage, for improvement of the physical condition of soils, and for the improvement of soil fertility through use of fertilizers and lime; it studies soil microbiological factors affecting crop production and it seeks to integrate soil and water practices into profitable conservation systems of farming. Research on these problems is conducted at 24 locations in 20 States and Puerto Rico.

On all problems, a team approach is used. For example, mulch tillage studies involve teams consisting of a soil microbiologist, an agricultural engineer, a soil physicist, and often a general soil scientist or a soil fertility specialist. These teams are usually made up of Federal and State researchers.

Some phase of erosion control research is conducted at most of the Eastern Section's locations. At LaCrosse, Wisconsin, for example, studies are under way on steep Fayette soils to develop pasture renovation procedures that will permit easy establishment of desired pasture species and at the same time hold runoff and erosion to a minimum. New investigations deal with ways to use corn occasionally in steep-land rotations and keep soil loss to a safe minimum. Interplanting of grasses and legumes in wide-row corn is one of the practices studied. Older work on terrace design and intervals, strip cropping and rotations is being continued in order to develop better erosion control practices. In Iowa and South Carolina, considerable emphasis is being placed on mulch tillage, particularly to find the reasons crop yields are often lowered when residues are used. Once these reasons are determined, the Section hopes to develop corrective practices. Use of cover crops for erosion control is being studied in Maryland, New Jersey, and several other locations. Many other erosion control problems are also being investigated.

Soil compaction studies are producing useful results. "Traffic pans" developed in certain soils under intensive cultivation are causing losses in production in New Jersey, New York, Mississippi, Louisiana, and elsewhere. Shattering or disrupting of these pans with tillage equipment materially benefits yield. In Mississippi studies, deep breaking sometimes doubled cotton yields. In New Jersey, reducing the amount of machine traffic materially improved potato yields. Usually tillage is only a short-term answer. There is still a lot to be done to get the final answers.

Considerable research is being conducted on supplemental irrigation. The present cycle of dry years has focused more attention on irrigation than ever before. Yield increases from irrigation during the past few seasons have been terrific. During 1953 in Missouri, cotton yields were increased from 1,400 pounds of seed cotton per acre to 3,400 pounds with only seven inches of irrigation water. Almost equally striking benefits have been obtained with other crops and at other locations. However, farmers who invest in irrigation equipment will irrigate during periods other than extreme droughts—periods when it will take some careful management to make good returns. Most of the Section's irrigation research is aimed at developing a stable humid-region agriculture. Emphasis is being given to finding ways to use water efficiently. How to determine when and how much to irrigate, crop and soil management practices that will permit maximum yields under irrigation, improvement in

Dr. Robert M. Salter, chief, Soil and Water Conservation Research Branch, Agricultural Research Service, United States Department of Agriculture, Washington. D. C.

the design of irrigation systems, development of water supplies—these are some of the objectives. Studies also are being conducted on water infiltration and storage in soils, and the use of climatological data for predicting irrigation needs.

Soil and Water Research in Irrigated and Dry Land Areas

The Western Soil and Water Management Section conducts research on soil and water management and conservation problems in the 17 Western States. Chester E. Evans is Acting Head while O. J. Kelley is studying in the Harvard Graduate School as a recipient of the Rockefeller Public Service Award. The objective of research in this Section is to develop on farms successful systems of irrigated and dry land farming capable of maintaining or raising the level of productivity of soils. The field, greenhouse, and laboratory studies are concerned with improvement of soil fertility and physical condition, microbiological and chemical factors in soil management, soil erosion control, moisture conservation, efficient use and conveyance of irrigation and drainage practices, management of saline and alkali soils, and the combining of promising soil and water conservation practices into farming systems for sustained production. Work is being done at 55 field locations in the 17 Western States. A few examples of progress in this research follow.

In the Pacific Northwest where runoff from melting snow is most responsible for soil losses, it was found that wheat rotations including legumes and grasses lost only 13 per cent as much soil as did alternate years of wheat and fallow and 28 per cent as much as wheat-pea rotations. Wheat production also was found to be highest when grown in rotations that were most effective for erosion control. In all the rotation systems, mulch cover obtained by the utilization of crop residues was the most effective method of reducing soil erosion losses on land seeded to winter wheat. In the Great Plains, those tillage methods that preserve wheat stubble at the surface invariably have been the most effective in abating the wind erosion hazard. In the drier areas, wheat yields have been shown to be as high or higher under the stubble mulch system of farming as under conventional plowing methods. Moreover, surface residues have been highly effective in conserving moisture by holding snow, reducing runoff, and lowering evaporation losses.

When irrigation water was first made available to development farms of the Columbia Basin, beans, corn, and other crops exhibited physiological disturbances which seriously affected production of these crops. As a result of accelerated research, the disturbance was identified as zinc deficiency, and in a year or two a practical solution to the problem was devised. At first zinc was supplied as a foliar spray; later a more economic soil application was developed. In some cases, crop yields have been nearly doubled by these treatments.

Other research in irrigation has resulted in more efficient use of water and higher yields of crops. For example, in an experiment at Mitchell, Nebraska, corn yields were increased from 69 bushels per acre without irrigation to 153 bushels with six irrigations. When the consumptive use of water was increased by irrigation from 10.3 to 21.4 inches, the irrigated corn yielded 7.1 bushels of grain per acre-inch of water compared to 6.7 bushels per acre-inch without irrigation. Irrigations during the critical stage of growth (just prior to tasseling through silking) were shown to be far more productive than similiar irrigations before tasseling.

Through better control of irrigation water, earlier harvesting methods, and use of nitrogen fertilizer, mountain meadow hay yields in Colorado were increased from less than a ton per acre to about 5.5 tons per acre. In addition, a comparable improvement in hay quality has been realized.

Toward Understanding Watersheds

The Watershed Hydrology Section under the direction of William C. Ackermann carries on the projects in hydrology, hydraulics, and sedimentation of small agricultural watersheds which were formerly a part of the Soil Conservation Service research program. They still are geared very closely to the needs of the SCS operations program.

Hydrologic studies on agricultural watersheds produce factual data on water yield, peak discharge, infiltration and other factors under various conditions of soils, land use, watershed size, and climate. Underlying cause-and-effect relations between runoff and other factors are analyzed so that the results of research can be understood and widely applied to other areas. The research includes tests to determine the effects on a watershed basis of proposed conservation practices which appear promising from tests on plots or fields. Investigations are carried out on natural watersheds which range in size from a few acres to several thousand acres. There are at present nine centers located in Maryland, Virginia, Florida, Ohio, Wisconsin, Michigan, Nebraska, Texas, and New Mexico.

The hydraulics of conservation structures are studied at the St. Anthony Falls Hydraulic Laboratory in Minnesota and at the Stillwater Outdoor Hydraulic Laboratory in Oklahoma. At St. Anthony Falls such structures as box inlets, straight drop spillways, and chutes have

been designed, tested, and improved. Standardized designs are developed for the use of design engineers throughout the country. The Stillwater Laboratory is best known for work done on grassed waterways used as terrace outlets and for other purposes. In these studies the hydraulic properties and permissible velocities for many grasses and soils have been determined.

Research in sedimentation is being carried out in New York State, Mississippi, and in the Missouri Basin with headquarters at Lincoln, Nebraska. Erosion processes, sediment transport, and deposition in channels and reservoirs are the subjects of investigation. From observations of sediment in the streams or reservoirs, the sediment production rates of various watersheds are determined. By measurements of the soils and the land use of those watersheds, general formulas are developed and improved so that sediment load may be predicted at other locations such as future dam sites. Stream bank erosion control is the objective of investigations of the hydraulic laws of streams. Understanding of such laws is important, for example, where detention structures in a stream may desilt the water and result in channel cutting downstream.

Conservation structures offer an example of the way the work of this Section assists the conservation program. Thousands of these structures are built every year, and it is essential that the most economic and effective designs be used. At the St. Anthony Falls Hydraulic Laboratory, a hydraulic design of a box inlet drop spillway was developed. A detailed description of the design of this structure was prepared for use by field engineers to enable them to accurately determine the capacity of the spillway either under the free flow conditions usually encountered in gully control work, or under the submerged flow conditions so frequently encountered when the structure is used in drainage work. Accompanying the description and design of the spillway was a design of an outlet for the structure which can be proportioned to adapt it to a wide variety of field conditions, while at the same time adequately protecting the structure itself, the dam, and the downstream channel from scour damage. This results in considerable saving in one of the most costly phases of a complete conservation program.

Soils and Plant Relationships

The Soils and Plant Relationship Section, under the leadership of Cecil H. Wadleigh, conducts basic research in the chemical, physical, and microbiological properties of soil and their effects on fertility and on plant growth responses to soil amendments and management practices. The Section is comprised of three major laboratories.

The U. S. Plant, Soil, and Nutrition Laboratory, Ithaca, New York, with K. C. Beeson as Director, conducts research on the effects of soil and geological conditions on composition of plants in relation to nutritional problems in animals and man.

The U. S. Salinity Laboratory, Riverside, California, carries on investigations pertaining to crop production on saline and alkali soils, reclamation practices, quality of irrigation and drainage waters, and the salt tolerance and water requirements of crops. H. E. Hayward is Director.

The Soils Research Laboratory, under Dr. Wadleigh's direction, is located at Beltsville, Maryland, and has a branch at Fort Collins, Colorado. Its research includes evaluation of soil properties and reactions between soils and fertilizer nutrients; investigation of the molecular structure of compounds in soils, plants, and fertilizers and the synthesis of organic compounds in plants; studies of the physiological and anatomical principles affecting absorption of nutrient elements by plants and the ability of plants to accumulate, utilize, or modify soil constituents; and biological assay of plant nutrients. An important phase of the program at Beltsville is carried on in cooperation with the Atomic Energy Commission and involves the use of radioactive tracer techniques.

Much of the research of this Section is applied in the Nation's soil conservation program. For example, the diagnosis and improvement of saline and alkali soils depends upon accurate measuring methods to determine their chemical and physical properties. Recent improvements have been made in a soil solution extractor and an electrical conductivity bridge for the determination of the salinity of soil and irrigation water. The new equipment combines portability, low cost, and sufficient accuracy for diagnostic purposes. A more widespread appraisal of saline soils should help farmers to avoid crop failures. New chemical methods help determine the amounts of exchangeable sodium and magnesium in soils and thus help determine the amounts of gypsum or other soil amendments required to reclaim saline-alkali and alkali soils.

Research on the quality of irrigation water has dealt with the occurrence of boron in toxic quantities and the effect on soils of using waters containing excessive amounts of bicarbonate. The Salinity Laboratory has developed a revised suitability classification of irrigation waters, taking into account the salinity and the sodium content as hazards to crop production. Salt-balance studies have been conducted in cooperation with other agencies to determine the trend of salt accumulation in several of our important watersheds. These investigations provide useful information as to whether or not current methods of irrigation and drainage are adequate to control the salinity problem.

"Diagnosis and Improvement of Saline and Alkali Soils" was published in 1954, as Agriculture Handbook No. 60.

Staff members also serve as advisors to State and Federal agencies in technical matters related to saline and alkali soils. Since its establishment in 1938, the Laboratory has cooperated in more than 40 projects which have been undertaken in all of the Western States and Hawaii.

Fertilizer and Agricultural Lime

The Fertilizer and Agricultural Lime Section, headed by Kenneth D. Jacob, conducts research on the preparation, technology and use of fertilizers, liming materials, and other soil amendments.

When new formulas for fertilizers are developed, the Section frequently produces sufficient quantities for field experiments by Federal agencies in cooperation with State agricultural experiment stations. The Section also cooperates with the Association of Official Agricultural Chemists and the Association of Fertilizer Control Officials in developing methods and standards for analysis of fertilizers and liming materials. Statistics on resources, supplies, production, consumption and trade relations of all types of fertilizers and liming materials are gathered, analyzed and published with the objective of increasing efficiency and lowering cost of these materials to farmers.

Research on granulation of mixed fertilizers to improve their handling and storage properties has meant great savings to farmers. High proportions of low-cost concentrated materials can be used in mixed fertilizers that are put in granular form and packaged in moisture-proof bags. Increase in plant food content of fertilizers reduces the costs of handling, bagging and transportation. Granulation of mixed fertilizers is now being rapidly adopted by the industry. Present production of granular mixtures is estimated to be at the rate of at least two million tons annually or approximately 15 per cent of the total domestic production of mixed fertilizers. It is expected that by 1957 more than 50 per cent of the production of mixed fertilizers will be in granular form.

Antelope Valley SCD Is Golden State Goodyear Winner for 1954

CHESTER A. COOVER

In administration, conservation education, planning and application, leadership of board members, organization and other activities, particularly the development of teamwork between the district, its cooperators, government and other agencies, individuals and private enterprises, Antelope Valley Soil Conservation District has set such a high standard that it has been declared the winner of the Goodyear Soil Conservation District Award in California for 1954. Here is a district that embraces more than a million acres and 3,000 operating ranch and farm units. Antelope is working with 2,150 of these farmer-ranchers on nearly a half million acres of land. The author tells how the Valley's soil, water and human resources have been protected and improved . . . because there is a Antelope Valley SCD.

STRETCHING OUT OVER more than a million acres, with headquarters at Lancaster, Los Angeles county, California, Antelope Valley Soil Conservation District has done such a top-flight job in assisting 2,150 farmers and ranchers with their soil and water and good land use problems on nearly a half-million acres, that it has been selected as the Golden State's winner of the 1954 Goodyear National Soil Conservation District Award.

Evidence supporting this citation is found in the leadership that the district has provided for individual farmers and groups of farmers and ranchers in developing conservation programs for their acres, and in the technical help that it has brought to them right out of their land.

It also lies in educational and information work that has attracted support from agricultural and non-agricultural interests, and has started the development of a new generation of conservation farmers. It is highlighted in the assistance that has been generated through interest aroused among city folks, industrialists, business and many other private enterprises and individuals. And, on top of all this, there is the assistance that has been given in helping farmers organize other districts.

Out on Antelope Valley farm land, the service that the district has rendered is spelled out of a program in which farmers and ranchers have made such conservation farming establishments as

25,500 acres of contour farming
28,000 acres of stubble mulching
43,500 acres of strip cropping
55,800 acres of crop rotations
36,000 acres of crop residue management

Chester A. Coover, member SCSA, Soil Conservationist Soil Conservation Service, Antelope Valley SCD, Lancaster, Calif.

All of these are good farming practices that combat erosion, increase the water-holding capacity of soil, help rebuild fertility, get full values out of fertilizers, manures and better strains of seed, and bring increased production. These are practices that farmers and ranchers establish with their own farm labor and equipment.

More than 100 miles of windbreaks, 2,500 acres of range and pasture seeding, more than 8,000 acres of deferred rotational grazing, 35,000 acres of improved water application, 25,000 acres of irrigation land leveling and 34,800 acres in farm irrigation systems also stand out in the path of progress that district cooperators have blazed.

District Excels in Leadership and Service

But, figures don't tell the full story. More of it, perhaps the most important part of it, is found in "terms of the water that has been kept in underground supply; soil nutrients that have remained available to plants rather than leaching away, and value of soil that has been held in place. Certainly the wealth and health of Antelope Valley's soil, water and human resources have been greatly benefited through its district's program," President Rex Davis declares.

The outstanding service of Antelope SCD stands out in the kind of emergencies in which a "feller really needs a friend" . . . when there is demand for leadership that will bring immediate relief. For example, a fire ravaged 30,000 acres, mostly in Littlerock Creek watershed, in July 1953. While the embers were still warm, the farmer-organized and farmer-operated district swung into action with a program in which 10,000 pounds of wild oats seed, obtained from the USDA Soil Conservation Service, were spread over a portion of the burn. On 8,500 of the acres, 62,500 pounds of black mustard and annual rye grass, provided by USDA'S Forest Service, were broadcast. Forest Service planes spread the seed, got good coverage. Other agencies—city, county, state and federal—and private enterprises, like the utility company, and private land owners were welded into a supporting team that helped the burn victims minimize their potential flood damages.

Likewise, in 1953, when Soil Conservation Service began to liquidate its nurseries, as part of a general reorganization, Antelope Valley SCD stepped into the emergency and leased the 10-acre operation at Littlerock, which was to be abandoned. From the SCS nursery at San Fernando it obtained and moved equipment and other facilities. It hired a full time nurseryman and kept production going at the old stand. As a result of the first year of operations, this small nursery has made 15,000 potted Arizona cypress, 75,000 black locust plants and 10,000 miscellaneous windbreak planting species available to its cooperators at production costs. It also is supplying rooted and unrooted cuttings of many various woody conservation planting materials. As a result of experiences in this trial year, doubled production of trees—up to 200,000—is the 1955 goal. This does not spell competition for commercial growers, because the kinds of planting material that the nursery produces are not handled, or are not profitable for commercial houses.

Leadership that the district has exercised in the conservation farming education field is spotlighted in the 15-minute radio program that it has sponsored weekly since 1950. Members of the board of directors appear on the program and interest other leaders, with varied experiences and knowledge, in participating. Work with school youth, and Boy Scouts also, is featured in this educational endeavor.

From another angle, the district has developed a solid heavy equipment program to meet needs of cooperators when work cannot be done with their farm machines and labor. The district started with one piece of equipment—a D-7 "cat" that cost $16,000. It now has a fleet of 2 D-7 tractors with carry-alls, scrapers, bulldozers, land planes, rippers, chisels, sheepsfoot rollers, specially modified drills for grain seeding, a carry-lift trailer for moving small equipment, a heavy truck and trailer for transporting heavy machinery, and many small pieces of equipment not usually found on farms and ranches.

Antelope SCD stepped into a very important role when it assisted in the formation of East Kern SCD. Present and former directors in the Antelope District spent a lot of time in Mojave, Bakersfield and Cantil in presenting the district idea from a director's and rancher's viewpoint. These neighbors responded by turning in an excellent establishment record during their first year of operation.

Over the years, wind erosion has been one of the principal headaches that farmers and ranches have had in the desert area, where dryland grain farming predominates. Here farmers have been encouraged and helped in establishment of strip cropping, windbreaks, land leveling and irrigation. Grain farming had its start there as far back as 1875, and had a good development until the mid 90's when a procession of low-rainfall years and crop failures put many of the growers out of business. A long come-back pull was started in the 1900's and by 1936 about 25,000 acres were again in grain, under a program in which about half of the grain land was held in fallow every year. When strip cropping came into use, every other strip was held in fallow, but the strips sometimes were 200 or more feet wide. Now they have been reduced to about 100 to 150 feet in width, and the land held for grain runs into about 50,000 acres. Most of this dryland strip cropping is in one piece—one of the largest continuous area of strips in the country, observers declare. From the air, it is a sight that plane occupants long remember.

Strip cropping alone is not what makes this dryland

"Stripcropping, stripcropping everywhere, and not a break in the line." That's the story in Antelope Valley, California, SCD and here's a sample of what your eyes see from the air, no matter which way you look. There are more than 50,000 acres, mostly in wheat. Annually half of this acreage, in alternate strips, is held in summer fallow.

grain farming profitable, or possible. It clicks when strips are teamed with such practices as crop residue management, stubble mulching, subsurface tillage, subsoiling and, occasionally, diversion ditches with safe outlets. Ninety per cent of Antelope's wheat land farmers are using this combination of practices.

Good Land Use Is Important

Studies made in the district indicate that on slopes up to six per cent, strips 100 to 150 feet wide, contour tillage, subsoiling and residue management provide control of run-off. Where strips are wider—200 or more feet—and slopes exceed six per cent, this protection is not adequate. Subsoiling in stubble strips has been proven to be very important because it opens the soil and permits it to take all the run-off from fall-seeded grain strips above. Generally, subsoiling, plus more stubble on the surface, with strips 100 to 150 feet wide, is a good bet to stave off erosion on six to ten per cent slopes. But, Charles B. Ahlson, USDA agronomist at San Fernando, who has studied the Antelope dryland and wheat farming area, warns that soils should be carefully checked before slopes of more than six per cent are cultivated.

"We've seen how old cropping practices have damaged foothill land," says Ahlson. "Some of this eroded land has been abandoned for cultivation and could be profitably seeded to permanent pasture or range. Steeper land should be turned into pasture.

"In time good cover will restore the structure of this soil, check erosion and provide some return. Good land use will keep other lands from being abandoned. The combination of basic conservation farming practices, such as those already established in the Antelope Valley Soil Conservation District is helping maintain the peoples' important soil resources."

With all of its other activities, the district staff has a special assignment in which it is cooperating with Edwards Air Force Base in solving a wind erosion problem. The chief aim is to carry out a sound and effective soil and water conservation program. Areas not suitable for growing vegetative cover are being treated with dust binder and other pallative materials. Establishment of perennial turfing involves fertilization, and sprinkler irrigation. About 30,000 feet of windbreaks are being developed. Controlling wind erosion on sandy soils subject to strong winds, as at Edwards, is one of the most difficult and stubborn conservation problems. SCS technicians assisting Antelope Valley District are meeting the challenge head on.

In its own name, Antelope Valley SCD is 11 years old, but the roots go back longer than that. The real beginning was back in 1941, when Portal Ridge SCD was organized as the fifth in California. It contained 45,270 acres, mostly sloping land on the southwest side of Antelope Valley. Three years later, another district, Antelope Valley, containing slightly more than a million acres completely surrounding Portal SCD, was organized. Both districts worked along in their own way until February 1947, when a special election was held and the two districts were incorporated under the Antelope Valley Soil Conservation District banner.

Book Reviews

APPROVED PRACTICES IN SOIL CONSERVATION. *By* ALBERT B. FOSTER. *The Interstate Printers and Publishers, Danville, Illinois. Illustrated. 1954. $2.00.*

THIS IS ANOTHER in the growing series of "Approved Practices" publications of The Interstate Printers and Publishers. In this publication, the author has presented the techniques of planning, laying out, and applying many well-known soil conservation practices. Chapters are included on using land within its capability, rotating crops, engineering instruments for soil conservation, calculating run off from watershed, grassed waterways and outlets, contour farming, contour fences, strip cropping, terraces and diversions, farm ponds, sandblows, shelter belts, managing farm woodlands, managing land for wildlife, improving and managing pastures and ranges, farm drainage, and conservation irrigation.

The appendix contains a chapter by chapter summary of approved practices in soil conservation and a glossary of soil and water conservation terms.

The publication is well illustrated with approximately two hundred figures, tables, and photographs. The line drawings illustrating construction methods are particularly good.

As the author indicated in his foreword, it is difficult to condense into one book all the information needed to do the job of soil conservation. He has, however, done remarkably well. The step by step descriptions of procedures to follow in using the various soil conservation instruments and in the construction of major soil conservation practices should be particularly useful. The language and writing style used are such that the book can be easily read and understood by both high school students and adults. This book should be of considerable usefulness to all persons who are concerned with the practical application aspects of soil conservation.

The author, Albert B. Foster, is the head of a Field Information Unit of the Soil Conservation Service, United States Department of Agriculture. He taught vocational agriculture in Missouri for eight years before going to work for the Soil Conservation Service.

ALFRED H. KREBS, *Urbana, Illinois*

UTILIZATION OF SALINE WATER: REVIEWS OF RESEARCH ON PROBLEMS. *Columbia University Press, 2960 Broadway, New York 27. 1954. $1.75.*

This publication has been prepared in accordance with the objective of promoting the coordination of research on scientific problems concerning the arid zone and the humid tropical zone by collecting and disseminating information on current research and assisting the implementation of projects that form part of a systematic program of basic research.

The review contains three reports which were commissioned by UNESCO in 1952 on the recommendation of the Advisory Committee on Arid Zone Research at its Second Session. Two of the reports deal with the biological problems of using salt or brackish water, that by Mr. Georges Grillot of Morocco, *French Zone*, dealing with research carried out in Europe, Africa and the Middle East, and that by Dr. H. E. Hayward of the United States of America covering the work done in the Americas, Australia and India. The third report reviews research on the purification of salt water, and is by Dr. Everett D. Howe of the United States.

Here is a new bulletin which stresses the interrelationships of natural resources. It was prepared principally for use as a part of the South Dakota State Course of Study in Science and Health for sixth, seventh, and eighth grades. The bulletin contains five divisions—soil, water, plants, wildlife, and minerals. Each section is designed so that it can be used separately or combined, either completely or partially, with the others. Selected concepts in each resource make up the divisions. Substantiating these concepts is basic information essential to their understanding. Each of the five major divisions have appended suggested student activities; a list of words for further study; textbook references for teachers; reading sources for pupils; names and addresses of magazines containing conservation material; and lists of visual aids.

THE IMPROVED NUT TREES OF NORTH AMERICA AND HOW TO GROW THEM. CLARENCE A. REED AND JOHN DAVIDSON. *The Devin-Adair Company, New York. 1954. 400 pages. Illustrated. $6.00.*

There is more in this book than just the exposition of "how to grow" nut trees. The historical accounting, the origin and dispersal of species provides entertaining reading and adds measurably to the book's reference value. It is obvious that the authors were not wholly scientific minded in their interest of nut trees for throughout the book the enthusiasm of the hobbyist is noted. It has been written for the "nutculturist" whose numbers are increasing.

The book begins with intriguing statements "to the reader" such as: "Exciting new varieties of nut trees are today attracting the attention . . ." The book will ". . . make all such trees better known and better grown for

the sake of a better land and a better life"; also that ". . . as many people as possible (will be interested) in the rewards to be found in breeding, planting, propagating, and making a living out of nut trees, and to help them do these things successfully."

The Juglan's Group makes up one-fourth of the book, half of which pertains to the Eastern Black Walnut. Species, varieties, their range, propagation, planting, and care are discussed. In like fashion so are hickories, chestnuts, filberts, oaks, and others. There are eight additional parts in the book.

Portions of the book cover the subjects of: *Propagation and Culture of Nut Trees; The Development and Filling of Nuts; Causes of Damage to Trees; and Food and Chemical Values of Nuts.* There is an excellent bibliograph following most subject chapters.

On reading this book, one is reminded of a book embracing much of the same subject matter written by Dr. J. Russell Smith, entitled *Tree Crops.* To those readers in whom Reed and Davidson have aroused interest, *Tree Crops* is recommended for collateral reading.

The reference to "Two-story agriculture" represents a type of farming embraced by the work "Hillculture" and coined by S. B. Detweiler some 20 years ago when he headed a section by that name in the Research Division of the Soil Conservation Service. This concept of land use for our rough or rolling farm lands will be adapted as population pressures increase along with associated demands for food from lands over taxed.

When that day comes "the farmer's son and all those, like him, who some day will be the custodians of the land which is our rich American heritage" will thank the hobbiest, the "Nutculturist," and all those persons who have found a keen and ardent interest in the selection and propagation of improved nut trees.

A. C. MCINTYRE, *Harrisburg, Pennsylvania*

PRINCIPLES OF GENERAL ECOLOGY. *By* ANGUS M. WOODBURY. *The Blakiston Company, Inc., New York, N. Y. 503 pages. 1954. $6.00.*

Dr. Woodbury's book on *Principles of General Ecology* is a broadly informative text written for seniors and graduate students. The subject matter is organized under two major subdivisions, namely: physical environment and biotic environment.

The author wades deeply into the inter-relationships of environment and analyzes the reciprocal interactions of plant and animal communities upon each other and their environment. The information is primarily valuable as a foundation course for students in the fields of plant ecology, animal ecology, geology, geography, limnology, oceanography, forestry, wildlife management, conservation and agronomy. However, greatest emphasis is given to animal biology.

The text is generously illustrated with drawings, charts, diagrams and photographs. Many of the latter were taken in the author's home state of Utah where he serves as Director of Ecological Research at the State University, in Salt Lake City.

A mass of ecological theory is presented coherently and logically. In the final chapter, entitled *Ecology and Human Affairs,* the author coordinates the elements of theory into a form that serves the peculiar needs of the human race. Part of the treatment deals with land conservation. It is pointed out that all of the natural sciences either contribute to or dip into this field of ecology and contribute to it—chemistry, physics, geology, zoology, geography, meteorology, astronomy, biology, bacteriology, botany and limnology are a few that provide fundamental contributions from which are derived further principles dealing with environmental intake and outgo of both materials and energies of living organisms. Also, he says that the principles of ecology form the foundations upon which rest such applied activities as farming, livestock-raising, forestry, conservation of wildlife, fish culture, and their derivatives, as well as sociology, engineering and military science. These, according to the book, have to do largely with the management of natural resources which in turn became the foundation of conservation.

It is pretty easy for soil conservationists to go along with Dr. Woodbury's claim that conservation is largely applied ecology, and that plans for the management of soil, water and biota fail in effectiveness unless based upon the principles of ecology.

Land, Dr. Woodbury says, is the basic resource. It serves as a storehouse of minerals, a reservoir for water, a conserver of soil fertility, a producer of plant crops, a home for wildlife and livestock and a recorder of historical sites and archaeological remains.

B. W. ALLRED, *Washington, D. C.*

THE CARE AND FEEDING OF GARDEN PLANTS. *Edited by* JOSEPH E. HOWLAND. *Rinehart & Company, Inc., 232 Madison Avenue, New York. 1954. 184 pages. $3.00.*

The Care and Feeding of Garden Plants, sponsored jointly by The American Society for Horticultural Science and The National Fertilizer Association, is not an ordinary book. This unique, one-of-its-kind books stresses plant feeding—or, in other words, what makes plants grow. Page after page of specially prepared colored plates make it easy to identify plan nutritional deficiency symptoms.

The authors are fourteen of our nation's leading authorities on plant nutrition. Topics covered include: lawns, ornamentals and woody plants, flowers, house plants, vegetables, and fruits.

Field Notes

Revitalizing Old Land Through Use of Perennial Grass Sods

Perennial grass sods are giving *new-ground* characterstics to worn, sandy cropland in Florida. Instead of clearing new land for watermelons and some of the vegetable crops, as they previously did, they are revitalizing old land and using it more efficiently.

Sods of pangola and Pensacola Bahiagrass were broken and followed by a variety of crops. A summary of the results included: 1. Seventeen acres of watermelons that produced nine carloads where 27 acres would usually be required to make the same yeld; 2. One hundred acres of watermelons that an experienced grower said was the best field of melons he had produced in his entire life, although the exact yield was not reported; 3. Tomatoes that suffered less nematode damage than usual, produced an excellent crop; 4. Four acres of irrigated flue-cured tobacco made 2,200 pounds per acre as compared with a local average of 1,200 pounds; 5. Seventeen acres of peanuts that produced 35,000 pounds, which was double average local yields; 6. Six acres of corn that made 65 bushels per acre as compared with the local average of about 15 bushels; and 7. Twenty acres of sweet sorghum, which produced 16 tons per acre as compared with 9 tons per acre on two adjoining 20-acre fields of similar land where no sod was present.

Use of perennial grass sods in rotations extends from the extreme western part of Florida down through the Peninsula. As evidence that farmers are not breaking sod to destroy grass, they often reseed Pensacola Bahiagrass to make doubly sure that new sod will be formed. They do this in spite of the fact that enough seed and plants remain from the original sod to restore a stand. Pangolagrass is allowed to reestablish itself from plants that survive cultivation operations.

Residues of fertilizer applied for cultivated crops stimulate grass to vigorous growth, thus making better pasture the following year.

H. E. Van Arsdall, *Lake City, Florida*

Farmers Friendship Tour to Europe

Mr. Louis Bromfield, the internationally known author, lecturer and agricultural expert, will lead 50 farmers, their wives and friends through Europe March 6 to April 13, 1955, on a very fascinating and most exceptional tour.

This tour, known as the *Farmer's Friendship Tour to Europe,* will be sponsored by the Scandinavian Airlines System and will have a tie in with top organizations abroad, and meetings with highest officials of agricultural ministries, associations, plus socially prominent people.

The Tour is scheduled to include stops in Copenhagen, Madrid, southern Spain, Rome, Italy overland, Switzerland, Paris, low countries by private motorcoach, London and Scotland. The price for the Tour will be $2,093.70. Additional information may be obtained by writing to Leonard J. Coppold, Scandinavian Airlines System, 629 Euclid Avenue, Cleveland 14, Ohio.

Outstanding Journal Article for 1954

Three authors of articles in the Journal of Soil and Water Conservation received awards Tuesday night, November 16, at the Society's annual banquet held in Jacksonville, Florida for the outstanding Journal article for 1954.

The awards were made on the basis of a membership poll conducted late during 1954 and were presented by the editor.

Authors of the award-winning articles were:

C. E. Busby, Soil Conservation Service, Berkeley, California, for a series of three articles on *Water Rights and Our Expanding Economy,* in the March, May, and July issues.

Wayne D. Criddle, of Logan, Utah, for an article on *Consumptive Use of Water and Irrigation Requirements* in the September 1953 issue.

Ben O. Osborn, San Angelo, Texas, for an article on *Effectiveness of Cover in Reducing Soil Splash by Raindrop Impact* in the January 1954 issue.

Iowa Has Unique Educational Plan

An Iowa bank and a soil conservation district have joined hands for 1955 in promoting a conservation program for pupils in the schools of their county. This program, now in its fifth year, has helped in focusing the attention of urban and rural residents alike on the need for conserving the natural resources.

Two hundred dollars in awards are offered by the cosponsors—the Warren County Bank & Trust Company and the Warren County Soil Conservation District.

The program generally is shaped to stimulate interest on the part of all pupils in the conservation of soil, water, timber, minerals and wildlife. This is to be accomplished through an activity which takes the contestants over a 155-acre farm owned by the soil conservation district. After the trip, the contestants prepare a five-year con-

SOIL CONVERSATION

By Felix Summers

Soil Conservation Society of America

"No, It Wasn't the H-Bomb,
Just The Result of Soil Erosion"

servation plan for the farm and it is on this plan that they are judged.

Specific requirements include a visit to the farm, the making of a plan and the holding of a Parents' Day Program at which individuals or competing units may present, in the form of skits, creative writing, songs or other media, many of the conservation principles learned and to be put into practice.

In judging, all rural schools are considered together and all urban schools are similarly grouped. Consideration is also given to the percentage of parents attending this program and this is weighed in the final judging.

The complete plan must include:

1. A large colored soil survey map of the farm (scale one inch to 220 feet).
2. A large land use map of the farm (same scale) showing planned field arrangement, conservation practices, and crops to be grown.
3. Sketches, diagrams or written explanations or discussions dealing directly with the individual plan.

An attractive program booklet has been issued to cover the 1955 contest.

Landlord-Tenant

(Continued from page 24)

Recognize the competitive demands on the time and pocketbook of farm people in working out farm plans.

Think and talk in terms of long-time net farm income and good farm family living as the financial goal of farming. This is a more useful figure than some others in current use, such as: net profit per acre, maximum amount of feed production per acre, low unit cost of production, minimum soil losses, and pounds of beef produced per acre.

As much as possible discuss the farm plan with *both* the landlord and tenant *together.*

Remember, the best way to save soil is to cultivate the human resources on farms.

In The News

Ervin L. Peterson, director of Agriculture for Oregon, has been appointed Assistant Secretary of Agriculture to succeed J. Earl Coke, who returns to California where he will resume his duties as director of agricultural extension.

Lowell Besley, executive director-forestry for the American Forestry Association, was recently elected chairman of the Natural Resources Council of America. He succeeds Samuel Ordway of the Conservation Foundation. The purpose of the council, an organization formed in 1938 and made up of 36 national conservation groups, is to create mutual awareness among member groups of the programs, policies and problems of their respective conservation interests.

W. W. Pate was recently appointed as assistant chief of the Soil and Water Conservation Research Branch of USDA's Agricultural Research Service.

A Department employee since 1935, Mr. Pate has had first-hand experience in the activities of all units of the Branch and their relation to the research of other Departmental agencies. He has served for the past eight years as special assistant for soils-research coordination, first in the Bureau of Plant Industry, Soils, and Agricultural Engineering and later in the Soil and Water Conservation Branch, under branch chief Dr. Robert M. Slater.

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With Never Before Achieved
Balanced Uniform Growth
All Season Long!
Your Assurance of
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and Greater Dollar Return!
FREE Pasture Book
For More Profitable Pastures
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Trade Mark
MOISTURE INDICATOR
This instrument registers directly
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THE SOIL MOISTURE
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Aids in preventing
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President's Column

Here it is the beginning of another year. What will 1955 mean to the Soil Conservation Society of America? We hope it will be a good year.

The appointment of committees is the first order of business at the beginning of each year. Perhaps it is the most important job that has to be done. A society such as ours goes forward if committees are active, and loses ground if committees are inactive. Good active committees, therefore, are the life blood of the Society. This is true at all levels of the Society. Unless committees do a good job, chapters fail to function.

Membership committees determine the numerical growth of the Society. Program committees determine the nature of meetings and other activities. One might single out the publication, JOURNAL OF SOIL AND WATER CONSERVATION, an as example of an activity not dependent upon committees. But even in this the Editor must have the support of a live committee—a live Editorial Committee.

Committees, however, can do little without support of the membership, so it all simmers down to this: Each of us has a major role in determining whether our Society continues to move in the right direction. By the right direction, we mean that it fills a need of the members. If it is doing that, it will not be hard to get new members and to hold the present members.

The annual meeting of the Society is to be held at Green Lake, Wisconsin, on September 12, 13 and 14, 1955. It is a beautiful spot which boasts of several different types of accommodations. It has a nice inn—separate cabins as well as dormitories. Prices are exceptionally reasonable. This sort of a meeting place was decided upon with the hope that, in addition to the groups who usually attend, a great many members who seldom come to the annual meetings because of the cost will attend this one.

So, mark the above dates on your calendar and begin to make your plans accordingly. You will receive more information on this subject as the time for the meeting draws closer.

The Council at the Jacksonville meeting had so may important matters to settle that unfortunately, Councilmen were unable to hear many of the talks. The amount of business that has to be handled is surprisingly large. Council actions will be brought to your attention in one way or another during the next few months. Some of the most important items are reported in this issue of the JOURNAL.

We all should feel proud of the great strides the Society has made in the short time of its existence. If all of us will put our shoulders to the wheel we can make it still more useful to the entire membership. I am counting on each of you to help make 1955 the most successful year the Society has enjoyed to date.

I believe that too little attention has been given in the past to the idea of holding members. Each year, it seems, a great many drop out. We have steadily increased the total membership each year, it is true, but in order to do this we first had to overcome the handicap of filling ranks thinned by persons who dropped out. Chapter activities are so very important in holding members in the Society. Only a small percentage of the total members can take in the annual meetings. So, to the rank and file of the membership, the Society is the Chapter and the JOURNAL.

AUSTIN L. PATRICK
President

1955 ANNUAL MEETING

Dates for the 1955 annual meeting have been definitely approved for September 12, 13 and 14, 1955, at the American Baptist Assembly grounds at Green Lake, Wisconsin. The Assembly is a former estate and has available all types of accommodations. All members will be able to find accommodations to suit their desires.

The convention dates are earlier than usual and plans are already under way to make the 10th annual meeting a highlight in the Society's history.

I. O. Hembre, chairman of the Wisconsin Chapter and Executive Secretary of the Wisconsin State Soil Conservation Committee, will serve as local arrangements chairman for the meeting.

On December 20, thirty-five members, representing all phases of conservation in Wisconsin, met in Milwaukee with Elmer Sauer of the national council and Wayne Pritchard, executive secretary, to make preliminary preparations and plans.

SOIL CONSERVATION SOCIETY
of
AMERICA
SOUTHERN CALIFORNIA
CHAPTER
- Join your local group
- Interesting meetings at rotating locations
- Dues $1.00 a year

Write to Secretary
MAURICE DONNELLY
Citrus Experiment Station
RIVERSIDE, CALIFORNIA

Journal Advertiser Given Recognition

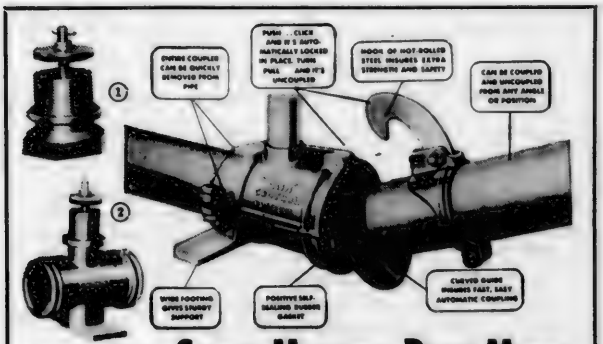
For an outstanding series of advertisements appearing in the JOURNAL OF SOIL AND WATER CONSERVATION, Harry Ferguson, Inc. has been recognized by the *Saturday Review*. The Ferguson Company is one of 26 companies honored recently for advertising in the public interest.

The *Saturday Review* on July 31, 1954 said:

"While the principal use of advertising will continue to be the selling of goods and services, many thoughtful business leaders have brought its techniques to bear to present the basic philosophy of their company or industry to dramatize their viewpoint about some aspect of the social and economic system . . .

"For the *Review's* 1954 awards, a committee of 40 judges was named. The distinguished group included educators, publishers, public opinion analysts, scholars, advertising and public relations executives."

Ferguson's advertising manager is Mr. Stanley S. Roberts, long-time friend of conservation and the JOURNAL. The advertising agency handling the account is Fuller & Smith & Ross, Inc. of Cleveland, Ohio.



1—Riser valve to make lateral connections to main lines
2—A portable mainline valve coupler
3—Valve opening elbow used to open and close No. 1 and No. 2 with connecting lateral lines to valves

Saves Money—Does More

There are many exclusive patented features in Hardie Rain Control that save you labor, time, money and make water go further—do more.
The Hardie Coupler and hook are attached by two-bolt clamps that fit any pipe without drilling, punching or welding.
Hardie Patented Valves absolutely eliminate troublesome costly surging. Only Hardie Rain Control gives you this priceless feature.
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PORTABLE SPRINKLER IRRIGATION SYSTEMS

CALIFORNIA CATTLEMEN

profit by fertilizing rangeland

6 to 8 weeks earlier range readiness!

★ **3 to 6 times more forage!**

★ **Protein and mineral content of forage increased!**

★ **4 times more beef production per acre!**

DEMONSTRATED RESULTS are shown in the Progress Report issued by Balfour, Guthrie & Co., Limited, covering two years' work on California Range Fertilizer demonstrations, using as the principal fertilizer:

"ELEPHANT" BRAND
Ammonium Phosphate Sulphate 16-20-0

Your copy of this report may be obtained by writing to any of the following offices:

BALFOUR, GUTHRIE & CO., LIMITED
San Francisco • Portland • Seattle
Los Angeles • Spokane • Chicago

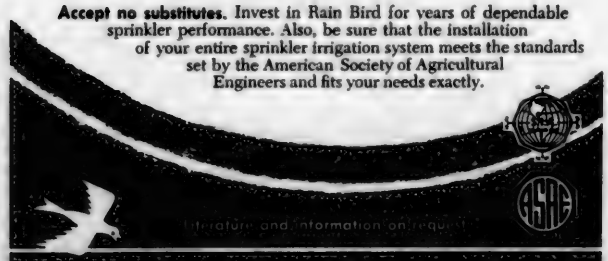
"ELEPHANT" BRAND FERTILIZERS ARE MANUFACTURED BY THE CONSOLIDATED MINING AND SMELTING COMPANY OF CANADA LIMITED, TRAIL, B. C.

RAIN BIRD

The FINAL WORD in Irrigation Sprinklers

For 20 years, Rain Bird has led the field in improved irrigation sprinklers. With its famous spoon-type, one-piece arm, open spring and simple, efficient bearing, Rain Bird has set the pace that others follow. Precision-built, with a minimum of moving parts, Rain Bird sprinkler dependability is something you can count on.

Accept no substitutes. Invest in Rain Bird for years of dependable sprinkler performance. Also, be sure that the installation of your entire sprinkler irrigation system meets the standards set by the American Society of Agricultural Engineers and fits your needs exactly.



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They
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"PARKERIZED"
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Manufacturers of Low Pressure Gates and Valves for Irrigation in various type in all sizes from 6" to 72"

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2437 East 24th Street
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1955 DUES NOW PAYABLE

All members have received a letter dated December 14, explaining recent changes in the Society's membership classification.

New members, those who have joined since August, 1954, and all others who hold a 1955 membership card are in good standing. All others are asked to submit their check or money order. Prompt payment will be appreciated as it will reduce the expenses of your organization.

WATERSHED CONGRESS PROCEEDINGS AVAILABLE

The National Watershed Congress, a joint project of several conservation groups, was attended by 300 persons from 40 states. The meeting was held in Washington, D. C., December 6 and 7. Proceedings of the Congress will be available at the pre-publication price of $3.00 until February 15, 1955. Send your money order or check to:

National Watershed Congress
1320 18th Street, N.W.
Washington 5, D. C.

SUSTAINING MEMBERS

Two types of sustaining memberships are now available—one for individuals and one for business firms, institutions, organizations, etc.

First individual to become a sustaining member was R. Y. Bailey, President for 1954, who sent his $25 in advance of the time when the constitution was changed to allow the Society to classify him as a sustaining member.

Second individual to support the Society in this manner is John E. McCuen, Soil Scientist with the Soil Conservation Service, East Greenwich, Rhode Island. On December 13 he wrote the national office: "In order to help get the ball rolling for a great year in 1955, I wish to submit my name as a candidate for admission to the grade of Sustaining Member. As you know I believe in the Society and wish to help it grow in whatever way I can. My check for $25 is enclosed."

Institutional Sustaining Member No. 1 is the Wm. C. Popper Company of 148 La-Fayette Street, New York, New York. Julien J. Proskauer, President, attended the annual meeting in Florida where his firm became a sustaining member for $100. The Popper Company will soon print the new booklet for the Society.

The provision for sustaining memberships will allow individuals, companies, or organizations wanting to support the Society in a more substantial manner the opportunity to do so. Proper recognition will be made and a framed certificate sent to those desiring this type of membership.

Regular dues for all other classes of membership are now $5.

MEMBERSHIP DIRECTORY

With the Society's membership the greatest in history as reported last month and now totaling 6,475, the national council has authorized publication of a membership directory. A directory was last published in 1950. Many requests from chapters, members, agencies, companies, etc., makes it advisable to bring it up-to-date. The publication will be distributed for $1.00.

To assure listing, dues for the member must be paid. All 1955 members will be listed.

A questionnaire, on green paper, was mailed to all members and it is hoped those who have changed positions, addresses, etc., in recent years will complete the questionnaire to bring their personal record in the national office up-to-date. It is the desire of the national council that the membership directory listing be as complete and accurate as possible and the cooperation of each member will be necessary.

RECENT NEW CHAPTERS:

New chapters formally organized and approved during the past few months include three student chapters and five regular chapters.

A student chapter known as the University of Michigan Chapter at Ann Arbor has received its charter. Michael F. Brewer is chairman; Hugh C. Davis is chapter secretary. Stanley Cain and Richard Weaver of the Conservation Department, School of Natural Resources at University of Michigan, are faculty advisors.

Thirty-six students of Texas A & M College, at College Station, Texas, have joined the new student chapter at that institution. The charter was approved by the national council during the recent business session. J. F. Mills of the Agronomy Department is the faculty advisor.

Paul S. Von Till has been elected chairman of the Rutgers Student Chapter at Rutgers University, New Brunswick, New Jersey. Russell Alderfer, Head of the Soils Department at the University, is the faculty advisor. The chapter has a membership of 12 at the present time.

President R. Y. Bailey recently presented charters to two chapters in his home state of Alabama. As a result of the organization of the two chapters Alabama has had one of the recent large gains in membership. A. L. Harrell of Birmingham has been elected chairman of the North Alabama Chapter and P. L. Wright of the same city has been elected secretary.

Malcolm Croft and John P. Bewley, both of Evergreen, Alabama, have been elected chairman and secretary, respectively, of the new South Alabama Chapter.

The 10th chapter in Kentucky, known as the Upper Kentucky River Chapter, has been approved. Chairman is Harvey D. Bradley of Jackson, Kentucky.

The charter for the South Carolina Chapter has been approved. Formerly known as the Spartanburg Chapter, the group is now a statewide organization. It has a large membership growth as a result. P. H. Mortgomery of Columbia is chairman and J. B. Earle of Chester is the secretary.

JOURNAL DEVELOPMENTS

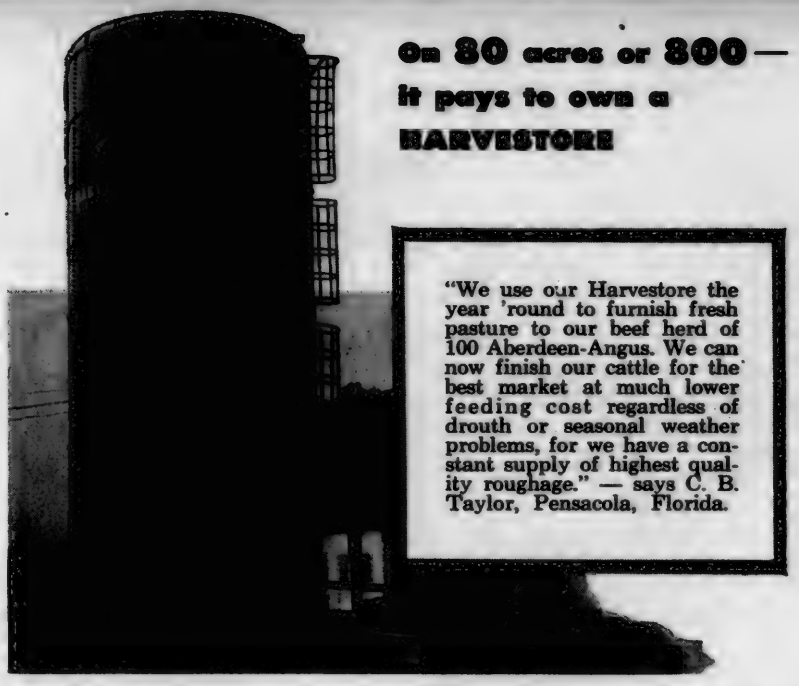
The January JOURNAL OF SOIL AND WATER CONSERVATION is in the form of a salute to the soil conservation district supervisors and the 9th Annual Meeting of the National Association of Soil Conservation Districts.

Charles Ahlson, SCSA member, San Fernando, Calif., has secured most of the additional advertising for the issue. He has also offered invaluable guidance in selection of content.

The Society is indebted to John Ferguson, Monumental Printing Company, Baltimore, Md., for his work on the first nine volumes of the JOURNAL. With this issue the printing has been transferred to Wallace-Homestead Company, Des Moines, Iowa, where working arrangements with the national office will be more convenient.

A new cover design by Felix Summers, member of SCSA, Milwaukee, Wis., plus other drawings will be noted in this issue. Mr. Summers will also create a series of original cartoon drawings entitled "Soil Conversation", the first on page 47 of this issue.

Additional changes in News Notes will take place during the next few months.—*Executive-Secretary.*



On 80 acres or 800— it pays to own a HARVESTORE

"We use our Harvestore the year 'round to furnish fresh pasture to our beef herd of 100 Aberdeen-Angus. We can now finish our cattle for the best market at much lower feeding cost regardless of drouth or seasonal weather problems, for we have a constant supply of highest quality roughage." — says C. B. Taylor, Pensacola, Florida.

In rainy season or dry, Harvestore gives you

fresh pasture the year around

HARVESTORE sealed storage keeps roughage field-fresh for year around feeding . . . in rainy seasons or dry. This sealed construction shuts out oxygen to prevent spoilage . . . at the top and all the way through . . . helps crops retain their field-fresh flavor and original high-nutrient value.

You get more tons of usable green crop nutrients without the danger of bloat. You avoid the work of daily field chopping, and the extra loss from trampling in the fields by livestock and equipment.

With Harvestore's mechanical bottom unloader, you feed from the bottom as you fill with successive crops at the top. Once you start feeding from the Harvestore, you can stop and start again any time, without feed waste.

With full use of this unusual storage unit, your livestock can maintain high production in spite of drouth periods.

That's how Harvestore gives you a more efficient feeding program . . . a steady supply of high quality feed, harvested when it's right . . . continuous filling and feeding out grass silage, haylage or corn silage that stretches your storage capacity — gives you 400-ton efficiency in a 200-ton unit. Its sealed construction saves nutrients and reduces the need for supplement feeds . . . lets you feed to meet the best market, or to keep up milk income and beef gains in times of drouth.

Mail the coupon for free folder, and see your Harvestore dealer for complete information applied to your own farm.

- **Sealed Construction** keeps out oxygen, the cause of spoilage
- **Glass-Surfaced Steel** inside and out — a permanent crop-storage structure that ends costly maintenance
- **Mechanical Bottom Unloader,** teamed with the conveyor of your choice, gives you practical push-button feeding for any size herd — beef or dairy

Mechanical feeders for grain or roughage

Sealed corn storage

Through research ...a better way

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Milwaukee 1, Wisconsin

A. O. SMITH CORPORATION
Dept. JSW-155, Milwaukee 1, Wisconsin

Please send me free circular on how Harvestores save labor, cut feed costs and increase farm income.

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Town .....R.F.D. .....

County .....State .....

Sunkist Growers Bids You a Sunny Welcome to California

California's oldest and largest citrus marketing association welcomes you to California and expresses the hope that many of you will take advantage of the convention's agricultural tour. This will be one of the highlights of your session here and is your big chance to view many of the varied aspects of the state's agricultural enterprises.

Sunkist Growers

Sunkist brings you fresh oranges, lemons, grapefruit and the world's most complete line of citrus products. The name Sunkist means top quality.

COPIES OF ANNUAL MEETING PAPERS AVAILABLE

Mimeographed copies of papers presented at the 9th Annual Meeting of the Society in Jacksonville, Florida, are available from the national office, 1016 Paramount Building, Des Moines, Iowa. A set of all the papers may be secured by sending $1.00 to cover mailing and related expenses, or single copies may be secured for 10 cents each. Papers available are as follows (please check those you desire):

- ☐ The Land—The Source of Our Strength—Governor Herman E. Talmage of Georgia
- ☐ Forest Protection and Timber Production in Relation to Soil and Water Conservation—Edward P. Cliff, Assistant Chief, U. S. Forest Service, Washington, D. C.
- ☐ Importance of Woodland Resources in Economy of Southeastern States—H. J. Malsberger, General Manager, Southern Pulpwood Conservation Association, Atlanta, Georgia
- ☐ Wet Lands in the Southeastern United States in Relation to Their Wildlife Values—Walter Gresh, Regional Director, U. S. Fish and Wildlife Service, Atlanta, Georgia
- ☐ Grassland Agriculture in the Cotton South—T. S. Buie, State Conservationist, Soil Conservation Service, Columbia, South Carolina
- ☐ A Review of the Economic Effects Experienced in Conservation Farming—Russell O. Olson, Agricultural Economist, Ohio State University, Columbus, Ohio
- ☐ Conservation of Diverted Acres to Meet Continuing Needs—Clay H. Stackhouse, Assistant Deputy Administrator for Production Adjustment, Commodity Stabilization Service, Washington, D. C.
- ☐ Landlord-Tenant Relationships—S. C. Hudson, Principal Economist, Canada Department of Agriculture, Ottwa, Ontario, Canada
- ☐ Landlord-Tenant Cooperation in Preparing Conservation Plans—James J. Wallace, Farm Manager, Iowa State College Agricultural Foundation, Ames, Iowa
- ☐ Educational Needs for an Effective Program of Soil and Water Conservation—Shelby M. Jackson, State Superintendent of Public Instruction, Baton Rouge, Louisiana
- ☐ Developments in the Small Watershed Approach to Flood Prevention and Conservation—Carl B. Brown, Director, Planning Division, Soil Conservation Service, Washington, D. C.
- ☐ Humid Area Irrigation, Growth, Problems, Benefits—Tyler H. Quackenbush, Soil Conservation Service, Washington, D. C.
- ☐ Water Resource Management—Competition for Available Supplies and Need for Water Rights Legislation—Clair P. Guess, Executive Secretary, Soil Conservation Committee of South Carolina, Denmark, South Carolina
- ☐ Water Resource Management—State and Local Responsibility for Solving Water Rights Problems—Sam A. Thompson, Chairman, Mississippi Inter-Organizational Committee on Water Resources, Itta Bena, Mississippi
- ☐ The National Conservation Good Turn Program, Boy Scouts of America—Elmaar H. Bakken, National Director of Rural Scouting, Boy Scouts of America, New York, New York
- ☐ The Effect of Organic Matter on Soil Aggregation, Permeability and Runoff—F. B. Smith, Department of Soils, University of Florida, Gainesville, Florida
- ☐ Report of Watershed Treatment Committee—O. W. Chinn, Director, Division of Flood Control and Water Usage, Department of Conservation, Frankfort, Kentucky

Servis FARM-BUILDING IMPLEMENTS

- ☐ Model "I-H" Whirlwind Terracer
- ☐ **Model "F" (3 pt. lift) Whirlwind**
- ☐ Gyro 84 and 57 Brush Cutters
- ☐ Pull Type Stalk Shredder
- ☐ Lift Type Stalk Shredder
- ☐ Zig-Zag Pulvi-Packer and Seeder
- ☐ Double Deck Soil Builder
- ☐ B & W Row-Weeder
- ☐ **"Sur-Stan" Press Wheel**
- ☐ 3-Way Ditcher-Terracer Blade
- ☐ No. 7 Angledozer (Row Crop Tractors)
- ☐ Berry Heavy Duty Ditcher (Row Crop Tractors)
- ☐ Hyteco Heavy Duty Angledozers (I 9 & W 9; Moline GTB)
- ☐ **Dump Type Rake**
- ☐ Lion "W" Loader
- ☐ "Force-Feed" Fertilizers
- ☐ Hudson Automatic Row Marker
- ☐ Wheeled Scraper (1 and 2 yds.)

Servis "Gyro-84" BRUSH CUTTER

The "GYRO-84" is a versatile rotary cutter for clearing crops or thickets, pasture control, stalk shredding, soil building and insect control . . . all through the year.

Minimum power required because of great blade momentum . . . V-shaped blade carrier and shear pin prevent stump damage. Smooth, steady cutting performance even in the roughest conditions. (Extra optional set of blades available for finer pulverization.)

cuts brush up to 3" in diameter on an 84" swath

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KWASHIORKOR!

Master Disease of All Diseases!

NEW DISEASE OF MAN!

(See Article in Scientific American Magazine, Dec. 1954)

CAUSE OF DISEASE—LOW PROTEIN DIET

CAUSE OF DIET—WASHED kOUT SOILk

CONTENT OF DIET—LOW PROTEINk

Cause of LOW PROTEIN—LEACHED Fertility

How Does It Affect You?

It's ENTIRELY up to you, because YOU, the soil conservationist, have only been looking at the physical aspects of soil erosion. Now let's crawl into the earth and get chummy with soil chemistry and biological society which really is more important than surface run-off and soil particle movement laterally, let's get acquainted with vertical leach.

In your hands and ability rest the health and food of all children yet unborn. In the mouths and half-starved stomachs of America's youth are the weak, low protein meats and grains that make 50 to 95 per cent of our prime youth physically unfit to defend their mothers, sisters, and fathers from attack by a foreign savage enemy should we be attacked.

In your hands and brain rests the ability to produce foods with 100 per cent more food value which in turn could and would build good teeth, bone, lung, and heart in modern youth.

How you educate people to apply water, mineralize and fertilize crops or destroy our soil fertility balance by over-irrigating or leaching out our precious soluble and leachable soil nutrients will determine what quality of food and man we will build today and tomorrow.

To study soil conservation without correlating the biological and chemical behavior of these factors as related to soil moisture is as erroneous as studying to practice modern medicine from books printed prior to the Pasteur discovery.

The Research Department of **PORTable ALUMinum IRRIGation COmpany** has discovered the proverbial Ponce de Leon's **"Fountain of Youth."**

1. We can increase the amino acid balance and content of tissue at least 100 per cent in most proteinacious plants.
2. We can double and triple the average bulk and nutrient yield of any crop per acre farmed.
3. We can make a dark loam out of a yellow clay or desert blow sand.
4. We can change the flavor and texture of the flesh of animal, fowl or plant tissue.
5. We can color fruit, give it greater keeping quality, and reverse the decline of old trees (*and possibly men*).

All this and many more miraculous results have been repeatedly accomplished on various soils by the use of our newly discovered **Fountain of Youth** method of sprinkler irrigation. Send for literature on **PORTable ALUMinum's "Fountain of Youth"** method of farming.

Write: PORTable ALUMinum IRRIGation CO., P.O. Box 878, Vista, California, or phone PALace 4-1123. Dealerships available—specify area.

ANNOUNCING MM's MOST POWERFUL TRACTOR ON WHEELS!

the NEW 5-plow MM model GB

74 BELT
64 DRAWBAR H.P.*

*Estimated horsepower of factory-equipped LP Gas model GB. Other models are available with engines for gasoline and tractor fuel.

Now, pull the big drill hook-up, the wide-cut harrows and disc plows ...do the BIG JOBS you never could handle before!

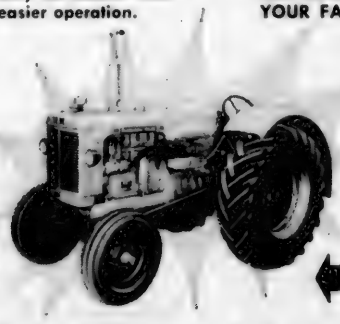
Here's the wheeled tractor that takes the BIG step up in work-power . . . gives you real section-sized capacity! It's the mighty new Minneapolis-Moline Model GB, powered to handle heavy loads no other wheeled tractor can handle as well! New from the ground up, it's *packed* with bonus wheeled tractor advantages only MM could offer. Only your MM Dealer can put you behind the wheel of this giant of tractors, for the power farming discovery of your life. See him soon!

NEVER BEFORE...WHEELED POWER LIKE THIS, WITH SO MANY NEW ADVANTAGES!

1. **TREMENDOUS NEW POWER!** High compression cylinder heads, stepped-up compression ratios, aluminum pistons, higher RPM give you power on a big new scale.
2. **HUSKIER, HEAVIER CONSTRUCTION!** This new GB is built to deliver its full power day-in, day-out. New heavier transmission, stellite exhaust valve inserts, larger connecting rod bearings, this new power giant has them all.
3. **NEW ENCLOSED PLATFORM!** Wide, non-slip platform gives you a safe, roomy place to stand.
4. **NEW FULL-CROWN FENDERS!** Enclose the platform to protect you from moving parts, dust, dirt and field trash.
5. **POWERFUL 12-VOLT ELECTRICAL SYSTEM!** Plenty of starter power for quick starts, bright lights with split sealed beams, new ignition performance.
6. **NEW CLUTCH SYSTEM!** Heavy duty double-disc hand clutch gives you smooth, sure delivery of the GB's tremendous power.
7. **NEW BRAKE SYSTEM!** Pedals on heavy-duty GB brakes work up through the platform, give you safer, easier operation.
8. **LIVE POWER TAKE-OFF!** Now you can slow or stop the tractor and leave the PTO running at constant speed and start the tractor forward again—all without touching gearshift or tractor clutch.
9. **MAXIMUM OPERATOR SAFETY!** Enclosed platform, full crown fenders, MM Visionlining for better visibility—these advantages make the Model GB safer and easier to drive.
10. **NEW, HIGHER CLEARANCE!** New front axle design of the Model GB gives you 15¼-inch front end clearance.
11. **NEW, HIGHER SPEEDS!** With 15-34 tires and 1300 RPM engine speed the GB gives you 2.7 mph in 1st gear, 3.8 mph in 2nd, 4.4 mph in 3rd, 6.3 mph in 4th, 14.8 mph in 5th, 2.1 mph in reverse.
12. **CHOICE OF GASOLINE, LP GAS OR TRACTOR FUEL ENGINES!** When you buy the new GB, you pick the MM engine that's factory-equipped to give you your biggest fuel savings.

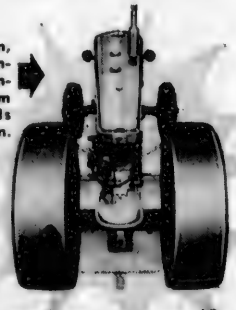
SEE YOUR MM DEALER NOW... GET THE COMPLETE FACTS ON THE POWERFUL NEW MM MODEL GB TRACTOR. FIND OUT HOW THE GB'S BIG BOOST IN POWER CAN PAY OFF ON YOUR FARM!

Full-crown fenders fully enclose the GB platform . . . Result: greater safety, better protection from dust, dirt and field trash.



Higher front end gives you improved clearance. Heavy-duty MM construction from end to end is your built-in assurance of dependable delivery of the GB's full power.

Wide, non-slip platform, Flote-Ride seat, handy control location, sleek Visionlining—this GB has them all! New brake pedals come up through platform.



MINNEAPOLIS-MOLINE

MINNEAPOLIS 1, MINNESOTA

NOW..5 Great New McCormick® FARMALLS

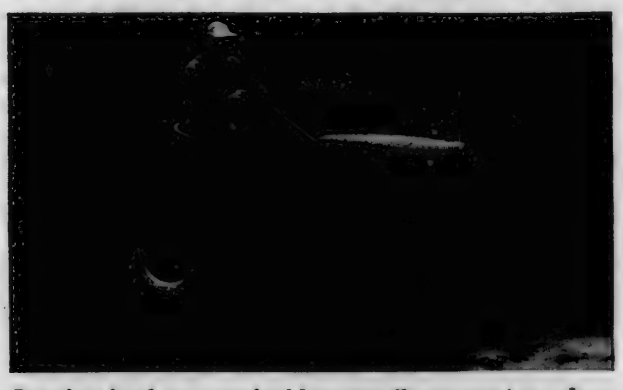
make soil saving easier on *every* farm

Turn hardpan into a "water blotter" with a Fast-Hitch subsoiler for the new 4-plow Farmall® 400. Torque Amplifier boosts pull-power on-the-go for non-stop chiseling . . . *20 inches* deep!

Make fast, hairpin turns in strip crops with the new 3-plow Farmall 300 and pto-driven baler. Halt independent power take-off to protect baler drive while tractor turns *non-stop!*

Cultivate point rows easily with the new 2-plow, 2-row Farmall 200. Independent hydraulic control of right and left cultivator gangs helps you get all weeds without crop damage!

Now, conservation is always in season! The new 1-2 plow Farmall 100 with Fast-Hitch lets you switch from regular field work to soil conservation jobs *seconds fast!* To hitch, you just back . . . click . . . and go!



Regular implements double as soil savers to reduce machinery investment. Here's a farmer filling a washout with the new one-plow Farmall Cub and mounted McCormick grader blade.

Remember the National Association of Soil Conservation Convention to be held in San Diego, California, February 2, 3, 4 and 5, 1955.

INTERNATIONAL HARVESTER

International Harvester products pay for themselves in use—McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Crawler Tractors and Power Units . . . Refrigerators and Freezers—General Office, Chicago 1, Ill.

The rain that benefits ...can also DESTROY!

LIKE most of nature's blessings, rain isn't always as beneficial as it might be. Often it destroys what it helps build . . . washes away our crops or the soil around root systems . . . starts sheet and gully erosion . . . silts our streams, blocks rivers.

Yet with proper land management, the right tools and the knowledge of experts, farmers can prevent the destroying hand of rain. It means keeping the rain up on the hills through contouring and strip cropping, planting marginal land to timber, filling in gullies, planting grassed waterways, building ponds.

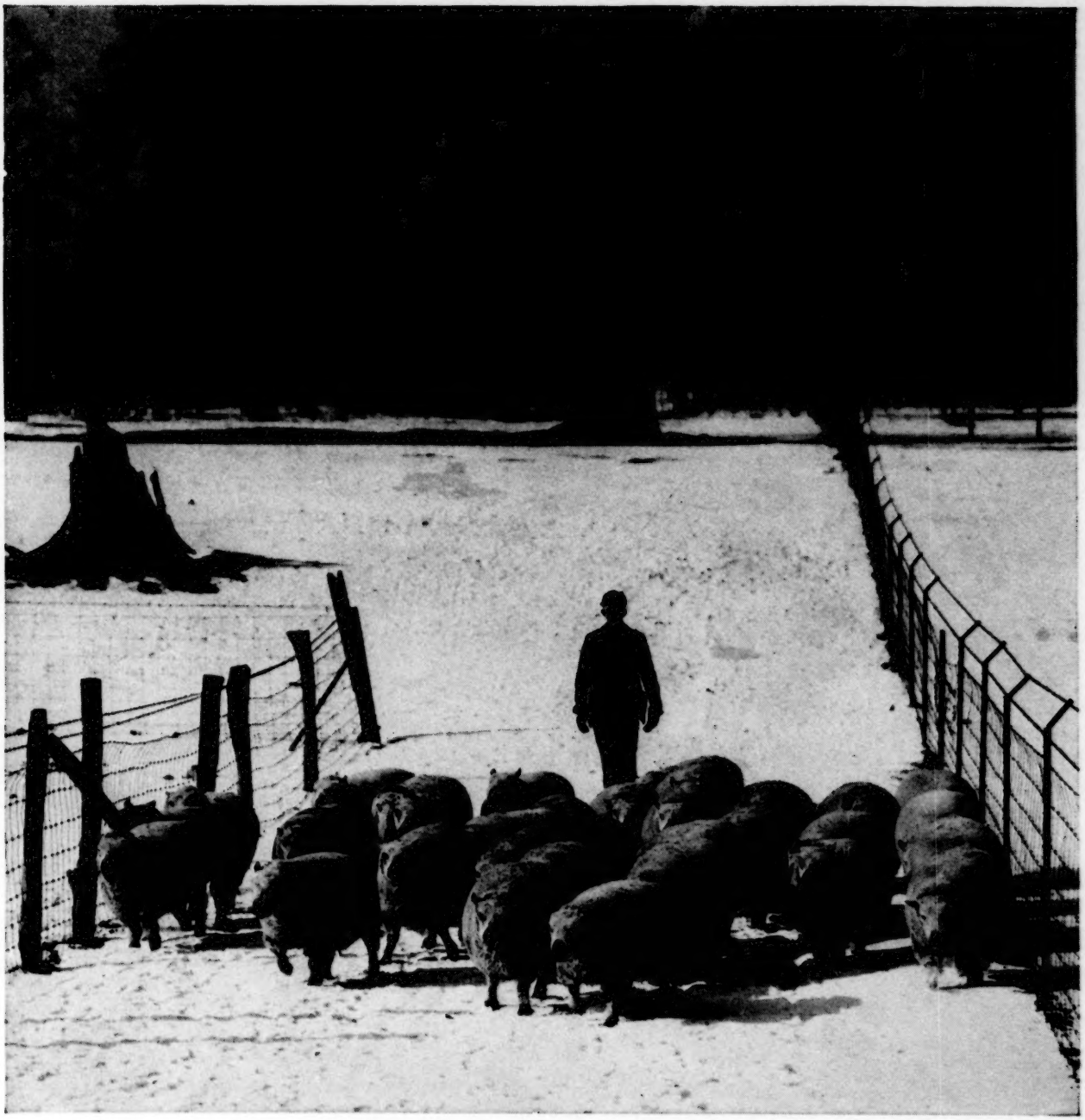
It takes tools like drill planters to follow the contours, one way plows to throw the soil up the hills and build terraces to help hold the soil in place. It also means holding soil with the high stubble left by Self-Propelled combines . . . breaking up hard pan with sub-soilers and chisels so heavy rains soak in quickly.

Here at Massey-Harris there's a continuing program of improvement and design . . . a never-ending policy to develop the machines and power the farmer needs to make more profitable use of his land, more profitable use of his time.

Soil conservation is a job for everyone. For the farmer who's land is at stake, for we who build the power and machines he needs to get the job done, for those who guide and instruct the nation's 6,000,000 farmers. Massey-Harris, Racine, Wis.

Make it a Massey-Harris

North America's fastest growing full-line Implement Company



What happens when your fields defrost?

Watch what happens when your fields defrost. Does melting snow disappear *vertically*, downwards into your soil? If so, you have good water storage . . . good protection against next summer's dry spells. Or does it disappear *laterally*, into gullies, creeks, or river? Then something is wrong underneath. Next summer's dry spells will hurt you. Your soil lacks storage capacity.

Most farm land needs increased capacity to store water. We must open the pores by mixing in surface trash, crop residues, and manure.

Two outstanding machines make the job easy and profitable: the NEW IDEA stalk and vine shredder, and any one of four NEW IDEA manure spreaders (including the new PTO, 120 bu. spreader).

Use them consistently. Spongy soil that stores *tons* instead of pounds of water will be your reward . . . a reward that you will count up in higher yields, year after year.

NEW IDEA

FARM EQUIPMENT COMPANY

AVCO

Dept. 1454, Coldwater, Ohio

COME TO LIFE IN BEAUTIFUL

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NATIONAL ASSOCIATION OF SOIL CONSERVATION DISTRICTS

FEBRUARY 1 THRU 6

Discover this sunny, beautiful, smog-free part of lovely Southern California. See Mt. Palomar, La Jolla, Coronado, Borrego Desert and colorful Old Mexico, the romantic foreign land just 30 minutes away. Sail, fish, golf and relax during your top-notch national convention in beautiful San Diego in February.